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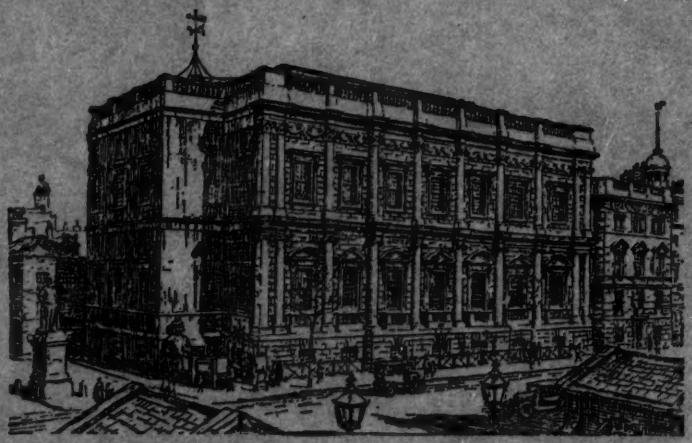

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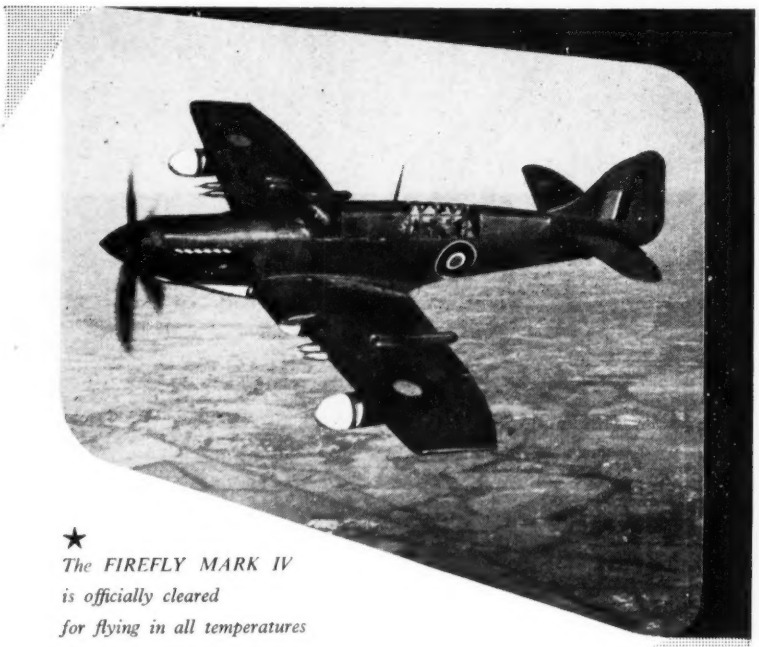

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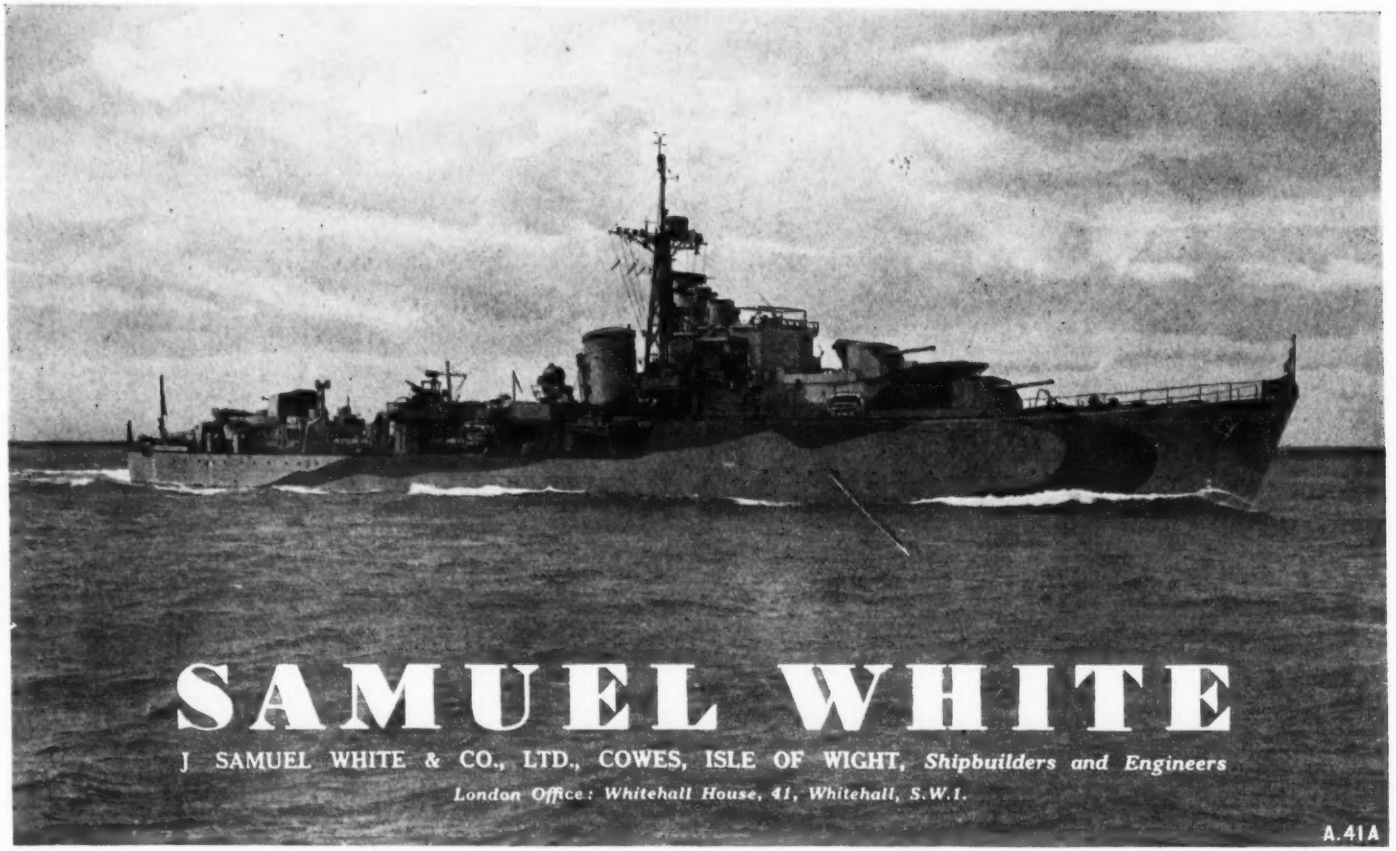
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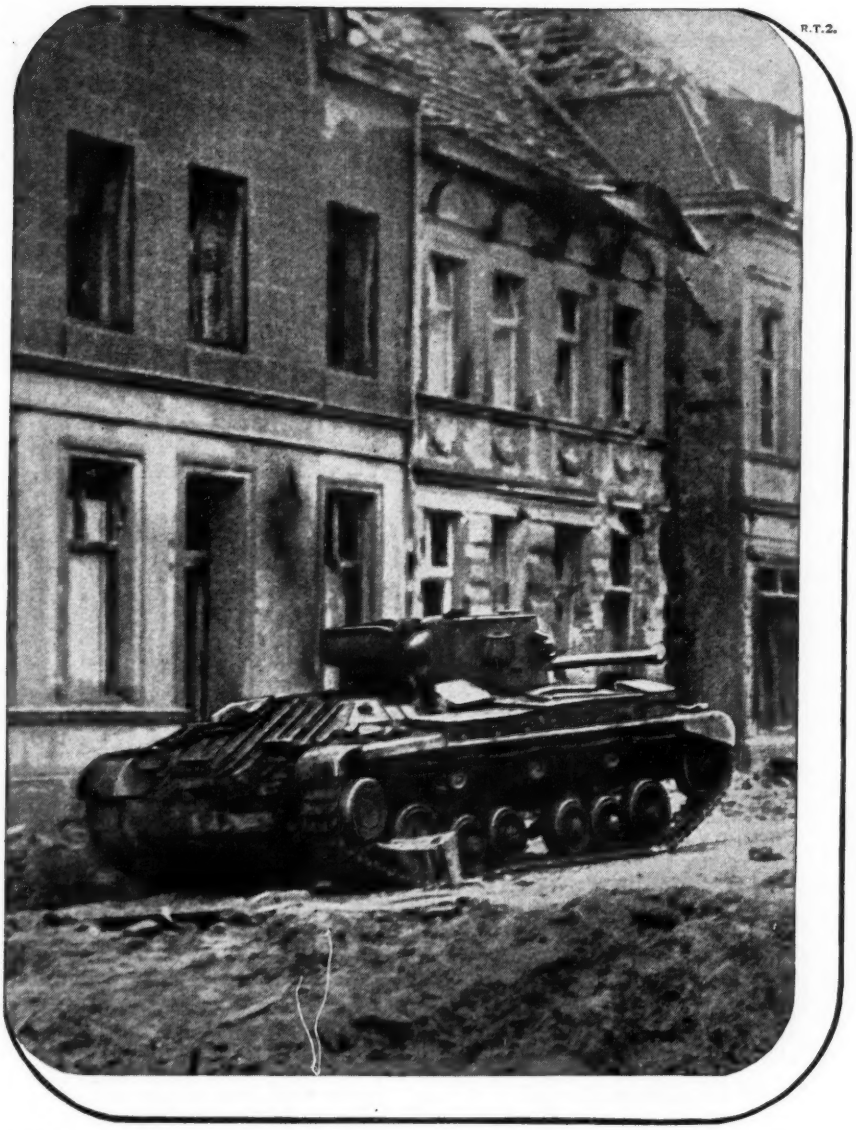

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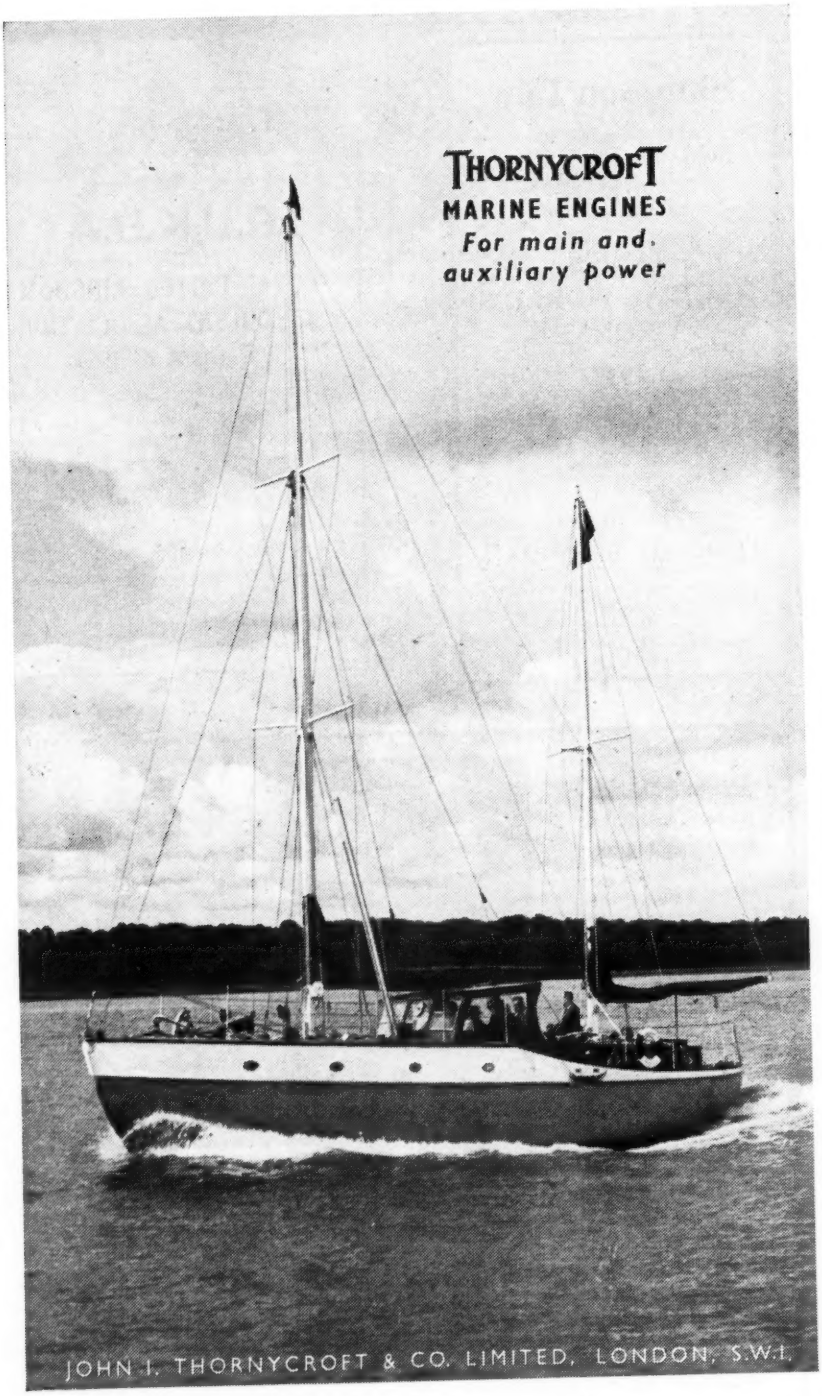
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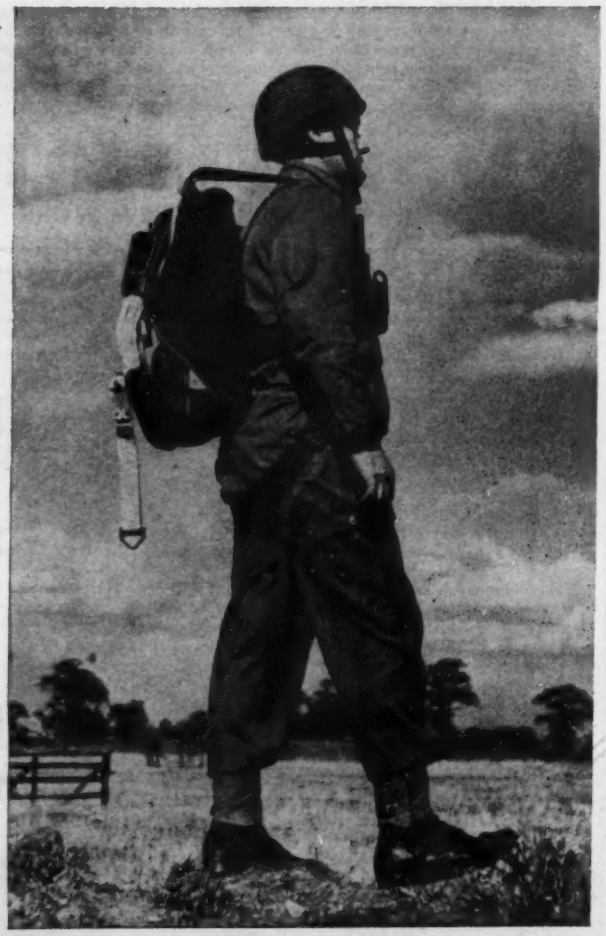

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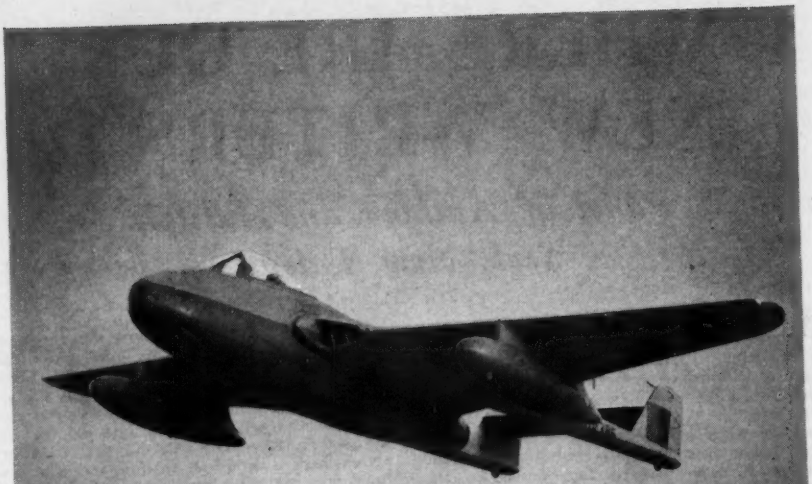

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CONTENTS

AUGUST, 1947

	Page
Secretary's Notes	xvii
Frontispiece : Admiral Sir Bruce A. Fraser, G.C.B., K.B.E., with Fleet Admiral Chester W. Nimitz, G.C.B.(Hon.).	
The Royal Navy in the Pacific (*Lecture*). By Captain E. M. Evans-Lombe, C.B., R.N. ...	333
The Projected Assault on Japan. By Martin Halliwell	348
Scientific Intelligence (*Lecture*). By Professor R. V. Jones, C.B., C.B.E.	352
The Trend of Future Warfare. By Lieut.-General Sir Giffard Martel, K.C.B., K.B.E., D.S.O., M.C.	370
Future Developments in Imperial Defence. By Lieut.-Colonel H. R. R. Conder, O.B.E....	374
The German Navy in Defeat. By Captain J. Creswell, R.N.	383
Manpower and the Services (*Lecture*). By Sir Godfrey Ince, K.C.B.	390
Economy of Manpower in the Services. By Brigadier F. A. S. Clarke, D.S.O.	403
The Auxiliary Territorial Service and Its Future. By Controller J. M. Cowper, A.T.S.	408
Incentives to Recruit. By Lieut.-Colonel J. G. Runciman	412
Coastal Command in the Victory in Europe (*Lecture*). By Air Vice-Marshal A. B. Ellwood, C.B., D.S.C.	416
Five Classic Cruisers. By Bernard Stokes	432
Standardization. By Lieut.-Colonel J. V. Davidson-Houston, M.B.E.	436
Aircraft Production for War. By Group Captain G. W. Williamson, O.B.E., M.C. ...	440
Naval Research and Development	447
How to Deliver a Lecture. By Geoffrey Crump, M.A.	450
What to Read—IV	455
The R.U.S. Museum	461
International Situation	463
Correspondence	466
General Service Notes	468
Navy Notes	472
Army Notes	484
Air Notes	490
Reviews of Books	497
Additions to the Library...	499

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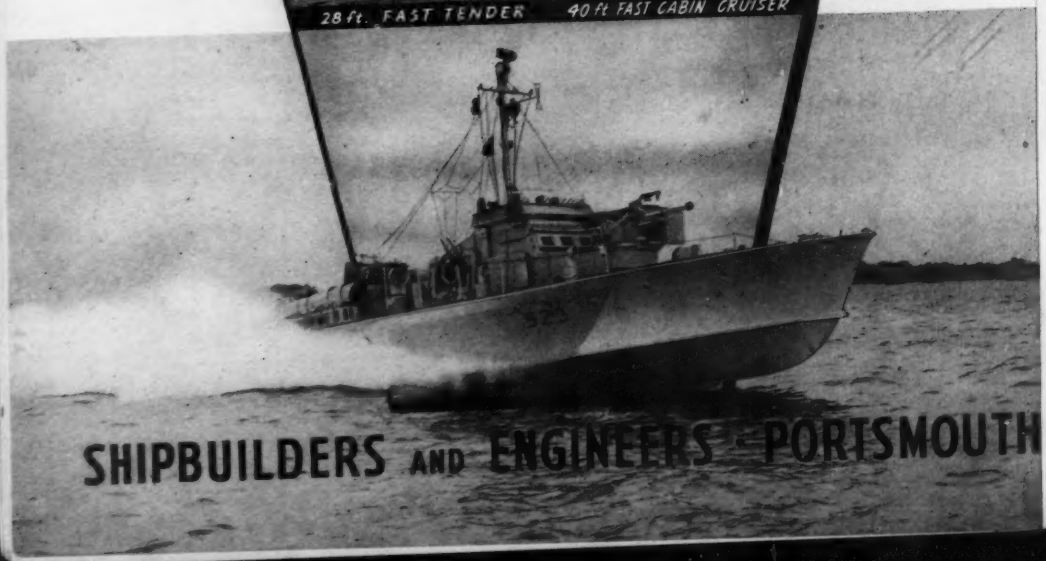

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August, 1947

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Lieut.-General Sir John Harding, K.C.B., C.B.E., D.S.O., M.C., has been elected a Member of the Council in the vacancy caused by the resignation of General Sir John Crocker, K.B.E., C.B., D.S.O., M.C., on taking up an appointment abroad.

Major-General R. G. Feilden, C.B., C.B.E., has been elected a Member of the Council in the vacancy caused by the resignation of General Sir Frederick Pile, G.C.B., D.S.O., M.C.

Major-General Ivor T. P. Hughes, D.S.O., has been elected a Member of the Council in the existing vacancy for a Territorial Army representative.

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Captain R. M. J. Hutton, C.B.E., D.S.O., R.N., has accepted service as an ex-officio Member on taking up the appointment of Director of the Royal Naval Staff College.

Air Vice-Marshal T. M. Williams, C.B., O.B.E., M.C., D.F.C., has accepted service as an ex-officio Member on taking up the appointment of Commandant of the Royal Air Force Staff College.

Honorary Members

Major-General A. J. Boase, C.B.E., has accepted the invitation of the Council to become the Honorary Member (Australia) vice Lieut.-General E. K. Smart, D.S.O., M.C.

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Assistant Executive Officer and Curator

Captain J. H. Laing, late the Nigeria Regiment, has been appointed Assistant Executive Officer and Curator as from 1st September, 1947. He succeeds Captain S. J. Parker, M.C., D.C.M., who has been Assistant Executive Officer since 1928 and Curator since 1940.

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The following officers joined the Institution during the period 30th April to 31st July, 1947 :—

ROYAL NAVY

Lieutenant-Commander C. H. Rankin, R.N.
Lieutenant R. W. Molyneux, R.N.
Rear-Admiral H. T. England, C.B., D.S.O.
Commander J. S. M. Richardson, D.S.O., R.N.
Captain G. Thistleton-Smith, G.M., R.N.
Commander R. E. Hutchins, D.S.C., R.N.
Sub-Lieutenant R. B. Montclare, R.I.N.
Lieutenant-Commander A. P. W. Northey, D.S.C., R.N.
Captain C. T. M. Pizey, C.B., D.S.O., R.N.

ARMY

Major B. Bergl, General List.
Captain W. J. Parsons, The South Wales Borderers.
Captain H. H. Spurrier, R.A.S.C.
Officer Cadet D. C. Wheeler, Officers' Training School, Bangalore, S. India.
Major I. M. Fraser, The Frontier Force Rifles, I.A.
Major R. M. Maxwell, 1/5th Royal Gurkha Rifles, F.F.
Major J. H. Robertson, late Royal Artillery.
Major C. A. H. B. Blake, The Royal Ulster Rifles.
Major A. G. D. Durnford, Royal Artillery.
Captain K. W. Costin, Royal Artillery.
Major Gurbachan Singh Bal, The Dogra Regiment, I.A.
Captain P. R. G. Krell, The King's Regiment.
Lieut.-Colonel H. H. Thomson, R.A.O.C.
Lieut.-Colonel J. R. Vedder, 15th Punjab Regiment, I.A.
Captain J. D. Colquhoun-Denvers, Royal Artillery.
Major J. L. Ashton, Royal Horse Artillery.
Major J. J. Carroll, Royal Tank Regiment.
Lieut.-Colonel R. G. B. Greggains, M.B.E., R.A.O.C.
Captain M. J. G. Martin, The Royal Welch Fusiliers.
Major P. F. Pentreath, M.B.E., Royal Signals.
Lieut.-Colonel John Wilson, 8th Cavalry, I.A.
Lieut.-Colonel D. R. W. Webber, The West Yorkshire Regiment.
Captain C. H. Thorne, Royal Artillery.
Major Mohan Lal Thapan, The Rajput Regiment, I.A.
Captain D. G. Hadow, M.C., Royal Artillery.
Captain A. E. Amor, The Royal Hampshire Regiment.
Lieut.-Colonel J. A. T. Barstow, D.S.O., H.A.C.
Major T. G. Steele, XX The Lancashire Fusiliers.
Major John S. James, Royal Tank Regiment.
Lieut.-Colonel G. M. Allen, The Royal Norfolk Regiment.
Major A. N. Ingram, late Royal Artillery.
Lieut.-Colonel L. H. Grant Taylor, The Queen's Own Royal West Kent Regiment.
Captain R. W. J. Arthur, Royal Artillery.
Captain John Lloyd, Transjordan Frontier Force.
Lieutenant D. W. R. Dodge, Canadian Army.
Colonel J. A. Grant Peterkin, D.S.O., The Queen's Own Cameron Highlanders.
Major P. W. P. Green, D.S.O., The Northamptonshire Regiment.
Colonel C. E. Morris, D.S.O., The Frontier Force Rifles, T.A.
Captain E. R. A. Sewell, M.C., Royal Artillery.
Major R. E. Ward, Royal Engineers.
Colonel A. D. Bourne, R.A.M.C.
Major J. C. Crombie, 5th Royal Gurkha Rifles, I.A.
Major R. C. W. Thomas, O.B.E., The Queen's Own Royal West Kent Regiment.
Major P. J. C. Trousdell, The Royal Irish Fusiliers.
Lieutenant J. A. S. Russell, late The Gordon Highlanders.
Major J. R. Beatty, M.C., The Argyll and Sutherland Highlanders.
Major G. P. Elliot, Royal Artillery.
Major L. F. Quintin Maclaine, M.B., R.A.M.C.
Major H. MacLennan-Sheard, late R.A.O.C.
Lieut.-Colonel T. Sutton, late R.A. (T) and Home Guard.
Field Marshal The Lord Wilson of Libya and Stowlangtoft, G.C.B., G.B.E., D.S.O.
Major B. B. Hall, M.C., 12th Royal Lancers.
Captain P. P. Steel, M.C., The West Yorkshire Regiment.

Lieutenant M. J. W. Wright, Royal Engineers.
Major G. E. J. Warland, The Bedfordshire and Hertfordshire Regiment.
Captain R. S. D. Maunsell, Royal Signals.
Lieut.-Colonel R. Wasey, M.B.E., Royal Signals.
Captain N. M. Bryant, D.S.C., Royal Artillery.
Major F. G. Heard, The West Yorkshire Regiment.
Captain T. H. Johnston, The Gordon Highlanders.
Lieutenant D. H. Thursby-Pelham, Royal Signals.
Major A. M. Clark Hutchinson, Australian Military Forces (R. of O.).
Brigadier W. G. Stirling, D.S.O., Royal Artillery.
Captain H. G. F. Trepess, R.A.S.C.
Major G. S. Graham, Canadian Military Forces (retired).
Major A. Masters, 1st K.G.V's.O. Gurkha Rifles, I.A.
Captain S. M. O'H. Abraham, M.C., XII Royal Lancers.
Captain C. A. Stahelin, The Bedfordshire and Hertfordshire Regiment.
Major Vinayak Mehta, Indian Signals Corps.
Captain A. S. Court, The Essex Regiment.
Colonel T. P. Jones, I.E.M.E.
Major E. A. D. Liddle, The Royal Ulster Rifles.
Colonel L. R. Mizen, C.B.E., 12th F.F. Regiment, I.A.
Captain J. S. Fielding, R.H.A.
Major L. N. Barker-Simson, R.A.S.C.
Captain P. H. K. Severn, The Buffs.

ROYAL AIR FORCE

Squadron Leader G. M. Brisbane, D.S.O., D.F.C., D.F.M., R.A.F.
Flight Lieutenant A. G. Reid, R.A.F.
Air Commodore C. E. Chilton, C.B.E.
Wing Commander H. J. Cundall, D.S.O., D.F.C., A.F.C., R.A.F.
Group Captain R. J. Cohen, A.F.C., R.N.Z.A.F.
Group Captain N. G. Goodman, C.B.E., R.A.F.
Squadron Leader N. M. Maynard, D.F.C., A.F.C., R.A.F.
Squadron Leader C. W. Laing, R.A.F.
Squadron Leader J. H. Cocks, R.A.F.
Squadron Leader D. M. Bidwell, R.A.F.
Flying Officer C. J. Nelson, R.A.F.
Flight Lieutenant W. Jones, R.A.F.
Flight Lieutenant J. E. Carr, R.A.F.
Wing Commander P. C. Lal, D.F.C., R.I.A.F.
Squadron Leader L. G. Press, R.A.F.
Wing Commander J. P. Cody, R.A.F.
Wing Commander P. H. Roscoe, R.A.F.
Flight Lieutenant J. E. Tipton, R.A.F.
Wing Commander D. J. Devitt, R.A.F.
Wing Commander O. R. Donaldson, D.S.O., D.F.C., R.A.F.
Group Captain P. H. Hamley, A.F.C., R.A.F.
Wing Commander D. J. P. Lee, C.B.E., R.A.F.
Squadron Leader B. P. Fortescue, R.A.F.
Flight Lieutenant T. P. McGarry, D.F.C., R.A.F.
Group Captain D. G. Morris, C.B.E., D.S.O., D.F.C., R.A.F.
Flight Lieutenant R. M. Horsley, R.A.F.

INCREASE OF SUBSCRIPTION

The rates of subscriptions to the R.U.S.I. have remained the same since the comprehensive Annual Subscription of 25s. per annum and the Life Subscription of £20 were introduced in 1926, while the Entrance Fee has been suspended since 1936.

Expenses of every kind, but especially wages and printing, have increased so greatly that the Council have been compelled to ask for powers to increase Subscriptions.

At the Anniversary Meeting, held on 4th March, 1947, a resolution to alter the Bye-law governing Subscriptions was passed and, as from 1st January, 1948, the following will be the rates of Subscriptions :—

Annual Subscription	£1	10	0
Life Subscription	£24	0	0 or four yearly
instalments of	£6	6	0 each.
Covenanted Life Subscription—Seven yearly instalments of	£3	12	0 each.

ADVANTAGES OF COVENANTED SUBSCRIPTIONS

Special attention is invited to the fact that Members joining during 1947 and existing Annual Members adopting the scheme of covenanting to pay their subscriptions for seven years will have the benefit of the present rate, *i.e.*, 25s. per annum until the expiration of the period.

Life Members joining during 1947 who covenant to pay their subscription by instalments of £3 os. od. a year for seven years will also get the benefit of this lower rate.

It is, therefore, much to the advantage of new Members to join at once under the Covenanted Scheme and for existing Members who have not yet adopted it to do so before 31st December, 1947.

All Covenanted Subscriptions materially assist the Institution because they enable Income Tax at the full current rate to be reclaimed on each subscription.

LIAISON OFFICERS

The following alterations to the list of Liaison Officers published in the February, 1947, JOURNAL and amended in the May, 1947, JOURNAL, have taken place :—

	NAVY
R.M. Barracks, Chatham ...	Lieutenant J. J. Day, R.M.
	ARMY
Northern Command	Lieut.-Colonel D. P. St. C. Roissier, O.B.E.
Southern Command	Lieut.-Colonel K. T. Roper.
Northern Ireland District ...	Major R. H. W. Fowler.
	R.A.F.
Coastal Command	Group Captain J. E. G.-H. Thomas, D.F.C.
Transport Command	Wing Commander F. Murray.

TRENCH GASCOIGNE PRIZE ESSAY COMPETITION, 1947

Subject

The following subject has been selected for the Trench Gascoigne Prize Essay Competition (Three Services), 1947 :—

" Discuss by what means the best of the Nation's manhood can be attracted to a career in the Armed Forces of the Crown."

A leaflet containing the rules and details of the awards for this competition was enclosed in the February JOURNAL. Copies can be obtained from the Secretary.

EARDLEY-WILMOT MEDAL COMPETITION

The competition for the medal instituted by the late Rear-Admiral Sir Sydney M. Eardley-Wilmot will take place this year.

The medal will be awarded for the best essay contributed by a Member of the Institution on :—

"Changes in Naval Warfare owing to New and Modified Weapons."

Essays must be typed in triplicate and each copy must be clearly marked "Eardley-Wilmot Competition" on the outside. Care should be taken to avoid confidential matter. When a reference is made to any work, the title of such work must be quoted.

Essays must be strictly anonymous, and each must have a Motto, which must be written on the outside of each copy. They must be accompanied by a sealed envelope with the Motto written on the outside, and the competitor's name inside.

All essays must be sent by registered post, and addressed to the Secretary, Royal United Service Institution, Whitehall, London, S.W.1, and must reach the Institution not later than 15th November, 1947.

MEDAL AND PRIZE

A gold medal will be awarded for the best essay, and if it merits publication, the writer will also receive a suitable monetary award.

Any essay written by a serving officer will be submitted for official sanction before it is published.

All essays submitted for this competition will become the absolute property of the Council

JOURNAL

Members are invited to offer suitable contributions for the JOURNAL. Confidential matter cannot be used, but there is ample scope for professional articles which contain useful lessons of the War; also contributions of a general Service Character, such as Strategic Principles, Command and Leadership, Morale, Staff Work, Naval, Military and Air Force history, customs and traditions.

The Editor is authorized to receive articles from serving officers, and if found suitable, to obtain permission for their publication from the appropriate Service Department. Army Officers are reminded that such articles must be accompanied by the written approval of the author's Commanding Officer.

REQUEST FOR BACK NUMBERS

The Editor will be grateful for any copies of the JOURNAL for February, May and August, 1946, which Members may have finished with, in order to meet applications for this number.

CHANGES OF ADDRESS

Members are particularly requested to notify any change of address which will affect the dispatch of the JOURNAL.

Naval Officers' Addresses

Naval Officers are strongly advised to keep the Institution informed of thier address as JOURNALS sent to them via C.W. Branch of the Admiralty are invariably greatly delayed.

MUSEUM

ADDITIONS

Sabretache of a Staff Officer, 1903.

Sabretache of a mounted officer of the Grenadier Guards, 1903.

Shoulder-belt pouch of the Chester Volunteer Rifles, 1900. (9336.)

All given by Miss Sloane.

Cocked hat worn by H. D. Graham, Master, Royal Navy, 1938-45. (9337.)

Given by Lieut.-Colonel C. E. A. Graham, R.E.

Four pictures of the 1939-45 War (9338) :—

(*a*) Painting of "Pauline Davidson, Women's Royal Naval Service," by William Dring.

(*b*) Painting of "Commander M. A. C. Biddulph, D.S.C., R.N." by William Dring.

(*c*) Painting of "Assistant Section Leader E. Henderson, M.M., and Sergeant H. Turner, M.M., Women's Auxiliary Air Force" by Dame Laura Knight.

(*d*) "Convoy" by Norman Wilkinson.

Allocated by War Artists' Advisory Committee.

A Royal Standard flown in H.M.S. "Vanguard" during the voyage to and from South Africa on the occasion of the Royal visit from February to May, 1947. (9339.)

Given by H.M. King George VI.

Model of the Gloster Whittle. The first gas turbine jet-propelled aircraft in the world to fly successfully. Pilot, P. E. G. Sayers, O.B.E. (9340.)

Given by the Gloster Aircraft Co., Ltd.

Naval General Service Medal with clasp "'Hebrus' with 'L'Etoile' 27th March, 1814."

Naval General Service Medal with clasp "Seahorse" with "Badere Zaffer" (6th July, 1808).

Naval General Service Medal with clasp "Off the Pearl Rock 13th December, 1808."

Naval General Service Medal with clasps "Weasel" (22nd February, 1812) and "Weasel" (22nd April, 1813).

Military General Service Medal with clasps "Chateauguay" and "Fort Detroit."

Indian Military Medal with clasps "Lucknow" and "Relief of Lucknow." (9342.)

All given by Lieut.-Colonel Sir D. G. Dalrymple-White, Bt.

Ship's Badge of H.M.S. "Vanguard." (9343.)

Given by Captain F. R. Parham, D.S.O., R.N.

LOAN

Pair of brass kettle-drums captured at the battle of Dettingen 27th June, 1743, from a French Cavalry Regiment, by General Ligonier, Regiment of Horse, late the 7th Dragoon Guards, now the 4th/7th Royal Dragoon Guards. (3692.)

Lent by the Officers 4th/7th Royal Dragoon Guards.

A Squadron Standard of the 8th (or Black Horse), later the 7th Dragoon Guards, now the 4th/7th Royal Dragoon Guards. It is the oldest cavalry standard in existence and was carried at the Battle of Dettingen, 27th June, 1743, when the Regiment was commanded by General Ligonier. (3693.)

Lent by Colonel H. S. C. Richardson.

CHRISTMAS CARDS

Christmas cards, specially designed for Members of the Institution, will shortly be on sale and orders can be booked now.

Card A. has a coloured picture of types of Her Majesty's Services at the time of the Crimea surrounding a medallion of the head of Queen Victoria, to whom the Institution is indebted for the gift of the use of the Banqueting House as part of its premises, and of the Prince Consort—a former Royal Patron. Inside is the Institution's crest. The price, including envelopes, is 12s. per dozen.

Card B. has the crest of the Institution on the outside and inside is a reproduction of a black and white sketch of the exterior of the Banqueting House. The price, including envelopes, is 9s. per dozen.

Postage in each case is 6d. for one dozen and 2d. extra for each additional dozen.

Members are requested to make early application for the number of cards they require, stating which design, A or B, and *enclosing the requisite remittance with their order*.

ROYAL WEDDING PROCESSION

Applications for seats to view the Royal Wedding Procession, on 20th November, 1947, can now be received.

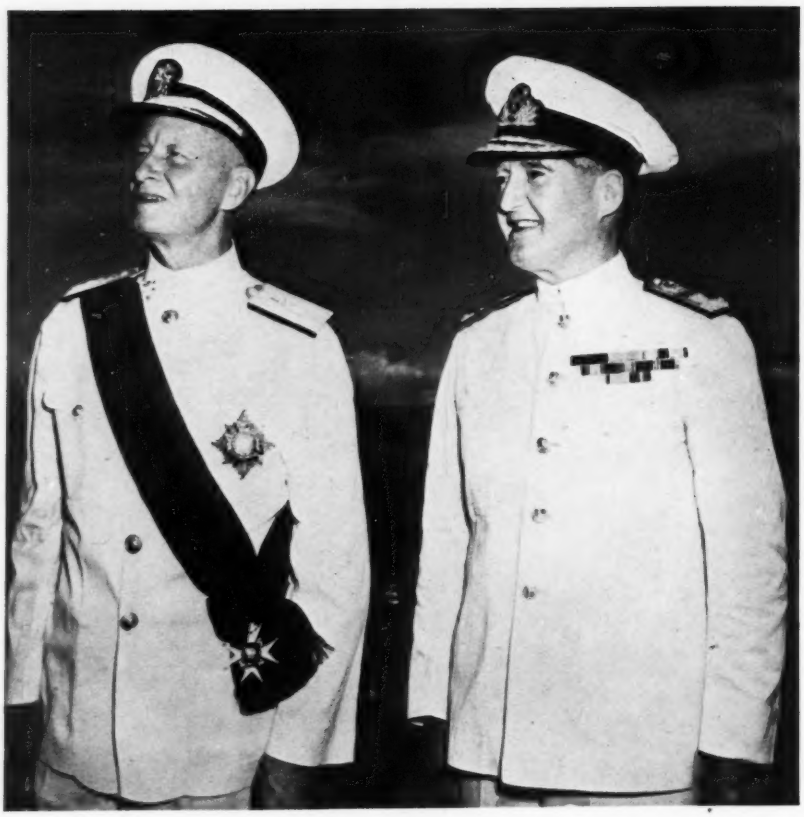
Members and their guests will be accommodated in the Banqueting Hall and the maximum number of tickets available to any Member (including his own) is three. *The charge will be five shillings each.*

Members only will be admitted to the Reading and Writing Rooms, for which tickets will be issued but no charge made.

Owing to the large number of applications, there is almost certain to be a ballot.

LECTURES

For the convenience of Members the list of lectures arranged up to the end of the current year is published as a separate looseleaf notice inserted in this JOURNAL.



ADMIRAL SIR BRUCE A. FRASER, G.C.B., K.B.E.
COMMANDER-IN-CHIEF BRITISH PACIFIC FLEET

WITH

FLEET ADMIRAL CHESTER W. NIMITZ, G.C.B. (Hon.)
COMMANDER-IN-CHIEF U.S. PACIFIC FLEET AND PACIFIC OCEAN AREAS

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[Authors alone are responsible for the contents of their respective Papers. All communications, except those for perusal by the Editor only, should be addressed to the Secretary, Royal United Service Institution.]

THE ROYAL NAVY IN THE PACIFIC

By CAPTAIN E. M. EVANS-LOMBE, C.B., R.N.

On Wednesday, 19th March, 1947, at 3 p.m.

ADMIRAL LORD FRASER OF NORTH CAPE, G.C.B., K.B.E.,
in the Chair

THE CHAIRMAN: It is a great pleasure to be here to-day to introduce Captain Evans-Lombe.

At the beginning of the War he was my personal assistant at the Admiralty when I was Controller; then he came as my Chief of Staff in the Pacific. Now he has gone back to the ordinary routine of a Flag Captain; and perhaps there are few more difficult jobs than that.

LECTURE

MY object to-day is to give you some idea of the activities of the British Pacific Fleet in that part of the War which was fought a long way from this country and about which it may be that not much is very generally known. I have the advantage that many of you must recently have listened to or read the address given here by that distinguished officer with whom we served, Admiral Spruance, U.S. Navy. He naturally enough gave the story primarily from the American angle. It is for me to deal more particularly with the part played by the British Fleet.

I propose to confine my remarks to those events of which I had personal experience, namely the formation and history of the main British Fleet in the Pacific. There were, of course, a number of other events in which the Royal Navy played a prominent part. The hard-fought actions in the early stages of the Japanese onrush, notably the Battle of the Java Sea when, in the face of great odds, we suffered such severe losses, and the subsequent attachment of the aircraft carrier "Victorious" and the minelayer "Ariadne" to the American Fleet, were matters of which I have only second-hand knowledge. I must, however, make special mention of the Royal Australian Squadron. The British Pacific Fleet was a truly Imperial force including, as it did, contingents from all the great Dominions, some of considerable strength. Included in the Fleet were a number of Australian destroyers and minesweepers. The cruisers and some destroyers of the Royal Australian Navy did not, however, come under the orders of the Commander-in-Chief, British Pacific Fleet. They fought their way forward from the Coral Sea to the Philippines mainly under the supreme

command of General MacArthur. It is safe to say that no ships flying the White Ensign saw harder fighting or acquitted themselves better. That story is, however, a separate one and I shall not attempt to deal with it in detail to-day.

THE STRATEGICAL CONCEPT

The formation of the British Pacific Fleet owed its origin to the firmly expressed intention of the British Government to deploy the maximum possible strength against Japan as soon as Germany was crushed. The method of carrying out this intention was, however, not easy to decide; but clearly, it had to be dependent on the overall Allied strategy. There seemed two broad courses of action for the Allies to adopt, both of which envisaged the ultimate need to invade Japan. One was the so-called "island hopping" policy. This involved a series of amphibious operations across the Pacific, under cover of the Fleet, by which bases were secured closer and closer to Japan and her sea and air power reduced until the stage was set for the final assault. The problem here lay in whether sufficient ground would be held to mount this assault without first of all obtaining a footing on the mainland of Eastern Asia. The alternative, or more probably complementary course of action, was a break through the Malacca Strait and a move up the China Sea until again a position was reached from which an assault on Japan could be launched.[1]

It will be seen that, until this broad course of action was settled, the exact role of the British forces in the Pacific and in particular of the British Fleet was in doubt. Three alternatives appeared open, either to reinforce the United States' effort across the Pacific, or to force the Malacca Strait, or to adopt a middle course of advancing through Timor and the Dutch Islands. This matter had still not been finally resolved when, in July, 1944, Admiral Fraser left England, at that time to assume command of our naval forces in the Indian Ocean.

Early Preparations

Certain preparations were, however, made which were of the utmost importance in the subsequent course of events. Among these, arrangements were made to move a large amphibious lift of landing craft to the East as soon as they could be spared from Europe. This, it was realized, must be a difficult operation involving a long voyage, much of it under adverse weather conditions. Planning and some preparations were put in hand for the use of Australia as a base. On the naval side certain valuable measures had been proceeding since early in the War, such as the building of the big dock and the preparation of the necessary berths at Sydney. In April, 1944, a combined Services mission went to Australia to prepare plans. The naval component, under Rear-Admiral Daniel, produced an invaluable report which went under the pleasing title of DOAP—Detailed Overall Administrative Plan—and which was one of our greatest assets when the decision to move to the Pacific was made.

Finally, and perhaps most important of all, steps were taken to prepare a Fleet Train of supply and repair ships—an organization which was essential if the naval forces were to be given the necessary mobility thousands of miles from their bases in the vast distances of the Pacific.

Logistical Considerations

One of the most important factors in the decision whether to move to the Pacific or not was the question of shipping. This was just where the shoe pinched all over the World. It was natural that the Ministry of War Transport and the other

[1] See Map at end of Lecture.

Services should view with some concern a commitment involving the use of great quantities of shipping on the immensely long lines of supply. Before it could be justified, it was necessary to show that it would pay a worth-while dividend.

Another factor which played a prominent part in the preliminary planning was the United States' insistence that all the British forces sent to the Pacific must be self-supporting. After close study of the problem on the spot I am convinced that this was a wise decision. It must be realized that the American resources, though to us appearing almost unlimited, were in fact not on a lavish scale if flexibility in carrying out plans was to be possible. Furthermore, with the collapse of Germany the Americans could themselves expect large reinforcements from Europe and an added strain on supply and maintenance.

Before leaving this question of the broad planning of the system of supply I must emphasize the importance to the Fleet of the industrial resources which surrounded the Tasman Sea in Eastern Australia and in New Zealand. We were immensely assisted by having the resources of this area and the skill of the English people who live in it, at our back. In no other area in the East does the Empire possess comparable facilities with, in addition, ample food supplies to support a large force. The position was greatly helped by the fact that at the time of the arrival of the British Pacific Fleet the American forces were rapidly moving out of Australia. In consequence we were able to take over some of the capacity thereby released. Shipping restrictions, however, made the date of our taking over rather later than we had hoped.

OTTAWA CONFERENCE

In September and October of 1944 there took place the Ottawa Conference at which a final decision was reached to move a large British naval force to the Pacific in support of the American effort in that area. The main body of this Fleet was to be drawn from ships already in the Indian Ocean, but this was in due course to be greatly reinforced from Europe. In consequence of this decision Admiral Fraser returned to London from Ceylon, where at that time he had his headquarters. It was possible to give approval, in consultation with the Australian Government, to proceed with plans already made for the establishment of an Australian base. At the same time orders were given for the aircraft carriers already in the Indian Ocean to be re-equipped, in the main with American types of aircraft, thus simplifying the conduct of the operations which were to come. This had the effect of bringing to an end a series of offensive carrier operations in the South-East Asia Command, which move, however, had the agreement of Admiral Mountbatten.

PLANNING AND PREPARATIONS

On 22nd November, 1944, Admiral Fraser hoisted his flag in Ceylon as Commander-in-Chief, British Pacific Fleet. Plans were made to assemble this fleet at Trincomalee and for a series of preliminary operations, designed primarily to weld the force together. The most important of these was an attack on the heavily defended oil centre of Palembang in the South of Sumatra, an operation which had been specially asked for by Admiral Nimitz, the Commander-in-Chief of the United States Pacific Fleet.

Having set these activities in motion under the charge of Admiral Sir Arthur Power—the newly appointed Commander-in-Chief, East Indies Fleet, Admiral Fraser and his principal staff officers left by air for Australia to meet members of the Australian Government and thence to go on to Pearl Harbour to meet Admiral Nimitz. Both in Australia and at Pearl Harbour we were most cordially received,

and it was at once apparent that we had the utmost goodwill of the Australian and American authorities and that the presence of the British Fleet in the Pacific was not only welcome but needed. We drew up with Admiral Nimitz a document, known as the Pearl Harbour Agreement, which formed the basis of our subsequent co-operation, which from that moment forward was of the very closest.

There can be no doubt that our work with the United States forces was greatly assisted by the fact that basically our two Navies have a common doctrine. There was, of course, much that was new for us to learn. The American methods of operating large numbers of aircraft carriers together was something of which the British Navy had not had much experience up to this time. The need for the fleet to remain at sea, sometimes for periods of months, involved a system of supply at sea which in its scale was something rather new to us and which showed up a number of deficiencies in the organization of the Fleet Train which had to be put right very quickly. A complete and very rapid change over to American methods of communication and signalling had to be undertaken. On the operational side, Admiral Nimitz made it clear that, subject to confirmation by the Joint Chiefs of Staff in Washington, he looked to see the British Fleet playing its part in the most forward operations against Japan. This involved participation in an operation designed to capture the island of Okinawa in the Ryuku Group, scheduled to start on 20th March, 1945, and known as operation ICEBERG. On our part we asked, and obtained, agreement for the joint use by the Fleet of the base at Manus which was clearly an essential point on our line of communication from Australia.

There followed a period of intense preparation at Sydney, where Admiral Fraser had decided the main rear base of the Fleet should be situated and where he himself intended that his headquarters should remain for the time being. The administrative plans, which I have previously mentioned, were put into effect and I cannot overemphasize the importance to us of this thoroughly prepared and worked-out scheme. Deficiencies in the Fleet Train which the Pearl Harbour meeting had disclosed were made good so far as essentials were concerned. This involved exceedingly rapid action by those at home to get ready in time.

At this time the United States forces under General MacArthur were engaged in the capture of the Philippine Islands, and Admiral Fraser left to pay a visit to the General and to witness the operations culminating in the landing in the Lingayen Gulf. It will be realized that General MacArthur's command was entirely separate from that of Admiral Nimitz and that it included the area in Australia and at Manus where the British Fleet was to be based. It followed that General MacArthur's concurrence with many of our requirements was necessary. Once more I can say that the co-operation with his command was very close and that our requests were always most sympathetically dealt with.

On 24th and 29th January, the British Fleet, whilst on passage from Ceylon to Australia, attacked Palembang. This operation, which was under the command of Rear-Admiral Sir Philip Vian—Senior Officer of Aircraft Carriers, was the largest so far attempted by the Fleet Air Arm, and met with stiff opposition. Nevertheless the attacks were pressed home with great success and, by the destruction of essential parts of the plant, the oil fields were placed largely out of action for the remainder of the War. We could now feel that we had a force tempered and united by experience in action. On 10th February the Fleet arrived at Sydney to replenish stores and to make good the considerable losses sustained in the Palembang operations. This was completed by 28th February, on which date the Fleet under the command of

Vice-Admiral Sir Bernard Rawlings and consisting of four aircraft carriers, two battleships, and the accompanying cruisers and destroyers, headed for Manus, to which port units of the Fleet Train had preceded them. We were now deployed ready for the start of operations.

SYSTEM OF COMMAND

At this point I would like to make a short digression to explain the system of command. The British Commander-in-Chief was under the operational command of the Commander-in-Chief, Pacific—Admiral Nimitz, but himself remained entirely responsible for the supply and maintenance of the forces under his orders. Admiral Nimitz in turn assigned the British Force to Admiral Spruance—Commander of the U.S. Fifth Fleet, who was in overall command of operation ICEBERG for the capture of Okinawa. On the supply side not only were resources drawn from the United Kingdom and areas in the control of the United Kingdom Government, but also from Australia and New Zealand. It followed that it was necessary for Admiral Fraser to have direct relations with the Australian and New Zealand Governments and, to some extent, to be responsible to them and dependent on their policy. It was entirely novel for the British Commander-in-Chief of a large force to be based on the self-governing Dominions, and the relationships which were established in consequence are, I consider, of great importance to the future.

The role of the Commander-in-Chief was, in fact, that of preparing and co-ordinating plans with the American commands and of ensuring that the supplies and resources available were adequate for the execution of these plans. Under the Commander-in-Chief were one or more task force Commanders, to use the American phraseology, who were charged with carrying out a particular job under the operational control of the appropriate American Fleet Commander. The supply and administration of the base was centred under the Vice-Admiral, Administration, with headquarters in Australia and also directly responsible to the Commander-in-Chief, whilst forward of Australia all supply on the lines of communications up to the Fleet at sea was the responsibility of the Rear-Admiral, Fleet Train.

OPERATION ICEBERG

I have already mentioned that the first operation in which the Fleet was to take part was designed to capture the island of Okinawa and also certain outlying islands in the Nansei Shoto. The possession of these positions in the Ryukyus was an essential preliminary to the assault on Japan, a fact which it was fully realized by the authorities must result in strong opposition. Furthermore, Okinawa was far nearer to Japan than any position which had so far been assaulted. The American authorities clearly and very rightly anticipated that the operation would be " tough."

The role assigned to the British task force was to hold the left flank by neutralizing the airfields in the southernmost of the islands known as the Sakishima Gunto, and also, when ordered, in Formosa. It was not thought that action against the Japanese surface ships was probable ; our concern was therefore primarily one of air warfare.

After the arrival of the Fleet at Manus a rather disturbing delay occurred before the approval of the highest authorities was finally given for us to join in ICEBERG. Matters were, however, finally settled and, on 17th March, Task Force 57, as it had by then become, sailed from Manus for the North. A call was made at the American Fleet Base of Ulithi to embark fuel and for final discussions with the American command. At the same time a large portion of the Fleet Train was moved on from Manus to Leyte in the Philippine Islands, which was to become our most advanced

base in this operation and the point from which we were to pick up supplies of oil fuel from the American Supply system.

On 23rd March, in accordance with plan, the operations were started by a series of strikes by the United States fast carrier task forces on Japan proper, and by a preliminary bombardment of Okinawa. Meanwhile a most intricate series of moves had commenced by which the United States assault forces from all over the Pacific started to converge on Okinawa and prepare to carry out the assault on 1st April. The movements of the British Task Force fitted into this picture and on 26th March they arrived in the operational area and delivered their first strike. From then on the general routine followed by the Force was to strike on two consecutive days and then retire to a pre-arranged position to fuel, returning again to strike two or three days later. The actual technique of attacking airfields and the aircraft upon them was something fairly novel to the majority of the Fleet Air Arm and we soon found that there was much to learn. For instance, the types of bomb carried were not found to be entirely suitable, while the need for an improved scale of photography soon became apparent. Nevertheless, our airmen established an ascendency from the first and made impossible any extensive use of the airfields which they were covering.

The methods of supply at sea also provided some novel problems. The system was that a detachment of the Fleet Train, known as the Logistic Support Group, cruised in the vicinity of a pre-arranged rendezvous and there joined with the Fleet as it came off operations. This group consisted of oilers, small aircraft carriers carrying replacement aircraft and spare pilots, store ships and, at a later stage, ammunition ships and a hospital ship. The Group was accompanied by its own anti-submarine protection, consisting of escort vessels and also aircraft from a small carrier which in addition provided cover from air attack. Escorted convoys of fully loaded ships were sailed at frequent intervals from Leyte to join the group, while ships which had been emptied similarly returned to Leyte in convoy. As you may imagine, the replenishment of the Fleet was an intricate operation and much improvement was achieved as more practice was obtained. Indeed the scene on a replenishment day was one of intense activity as, in addition to all I have described, there were officers and despatches to be moved from ship to ship by destroyer whilst in the background all ships not otherwise engaged were kept busy carrying out anti-aircraft practice.

An important factor in the success of these replenishment operations and all the corresponding operations of the United States Fleet was the apparent lack of enterprise of the Japanese submarines. It was possible and profitable to take risks which would not have been justified in the case of German submarines. Nevertheless, the ability to make a large move of the replenishment area between successive operations was a very real safeguard. In the main the weather did not provide a serious handicap, though quite severe conditions were encountered, particularly during the typhoon season. Here again our ability to overcome adverse weather conditions greatly improved with practice.

An invaluable link on the line of supply which should be mentioned at this point was 300 Group of the Royal Air Force who, with great efficiency, provided an air line from Australia to the most advanced Fleet Base which, at the time I am now discussing, was Leyte. This Group not only provided a quick and regular delivery of mail—a most potent factor in the maintenance of morale, but also gave transport to all manner of small but important and urgent stores required by the Fleet. As an instance of the importance of their work, there was at this time a severe shortage of oil fuel hoses required for fuelling at sea. Had it not been for the ability of 300 Group

to fly spares forward it is very likely that our operations would have been brought to a standstill. Again the existence of this air line enabled the members of the commander-in-Chief's staff, though thousands of miles away in Sydney, to join the Fleet off Japan by only four or five days travelling. We, all of us, therefore, were able to pay frequent personal visits to keep closely in touch with what was going on and to learn at first hand what were the requirements of the Fleet. I must explain that, after arrival at the advanced fleet base, passengers and air freight were transferred to ships of the next convoy going up to the replenishment area, thus it was possible to arrange that every time a ship came back to oil she received a mail—a very great benefit.

During the period I have been discussing we obtained experience of *kamikaze*, or suicide attacks by the Japanese air forces. When H.M.S. " Indefatigable " was hit, the value of the armoured decks of our carriers as a defence against this form of attack was very clearly demonstrated, and it was possible to get the ship back fully into action in a few hours. It would be wrong, however, to minimise the importance of the suicide attack and the severe loss and damage which it occasioned. In the Okinawa campaign the United States Fleet had 368 ships of all types damaged and 36 sunk primarily by suicide attacks. The great difficulty was to identify which of the enemy aircraft in the vicinity of the Fleet intended to suicide and, having done this, to be 100 per cent. certain of their destruction : nothing less than this was sufficient.

On 7th April occurred the last sortie of the Japanese surface forces, when the battleship " Yamato," accompanied by cruisers and destroyers, came out through the Bungo channel and made for Okinawa with the apparent object of disturbing the landing then proceeding there. It was little more than a suicide attempt. The Japanese were engaged by the aircraft of the United States fast carrier task force ; the " Yamato " was sunk and the others sunk or dispersed. To our disappointment the British forces being to the South could take no part in this action.

Towards the end of April the Fleet returned to Leyte for a brief period of replenishment. At this time we had not yet developed fully our ability to remain continuously at sea. I was staying on board the flagship at the time and remember thinking in what good form everyone was, and that it would not be long before the full capacity to carry out continuous operations at sea would be achieved.

The weather at Leyte was very hot and sticky and conditions below, especially in the engine rooms and boiler rooms, most unpleasant, while there was little inducement or opportunity to go ashore. Everyone was looking forward to getting to sea again. Those of the Fleet Train who remained at the base had the worst of it.

In May our ships were once more " on the pitch," this time undertaking strikes not only at Sakishima but also on Formosa, and on one occasion closing the coast and bombarding a nearby airfield with the heavy guns. The *kamikaze* were still a serious menace and both the carriers, H.M.S. " Formidable " and H.M.S. " Victorious," were hit. They, however, were brought back into action. By the end of May control of Okinawa was assured and land-based aircraft well established on the island. On the 25th our forces were, therefore, released to return to Australia to prepare for the next operation. At this period the number of ships in the Fleet Train was still inadequate to keep the Fleet forward the whole time, and an occasional return to Australia was necessary. American experience had been that the maintenance of a Fleet more than 2,000 miles ahead of its nearest shore base was not really economic. Australia lay 4,000 miles away with no intervening shore establishment.

The ships arrived in Australian ports on 5th June to fill up with stores and ammunition and to make good battle damage, a job which was completed by 28th June. I should like to pay tribute to the work of the Australian dockyards who completed all that was essential most efficiently in this short period.

SUBMARINE OPERATIONS

At this point I will digress for a moment to mention the work of our submarines. Two flotillas were based on Freemantle for operations in General MacArthur's area under the command of the Commander, 7th Fleet, and in close co-operation with the American submarines. British submarines were, in the main, suitable for operating in shallower water than their American counterparts; on the other hand, they had not the same endurance and range of action. Accordingly the operating area assigned to them was in the Java and Banda seas, an area which by this period was not a particularly fruitful one. H.M.S. "Trenchant," however, carried out an exceptionally fine attack on the Japanese cruiser "Ashigara" in very shallow water and, by sinking the ship, still further reduced the very limited Japanese surface force still at Singapore and relieved General MacArthur of a danger for the security of various combined operations which were at this time proceeding further to the North.

By May the Americans were once more in full control of their old submarine base—Subic Bay, in the Philippines, and one of our two flotillas proceeded there for operations in the China Sea. In July a Midget submarine flotilla carried by the depot-ship "Bonaventure," joined this force. Immediately before the end of the War Singapore Harbour was penetrated by these craft under conditions of exceptional difficulty and a Japanese cruiser was successfully attacked. For this exploit one of the commanding officers—Lieutenant Ian Edward Fraser, D.S.C., R.N.R., was awarded the V.C.

THE FINAL ASSAULT[1]

By June the pattern of the final assault on Japan was becoming clear. This was to take the form of an assault on the island of Kyushu in early November, followed in May, 1946, by a landing close to Tokyo which was expected to finish the War. In the Kyushu operation the British contribution was to be primarily a naval one, although it was hoped to establish a force of the Royal Air Force heavy bombers at Okinawa in time to play a part in the later stages. An assault by British and Dominion troops was to form part of the final attack on Tokyo. A decision had been made that it would not be necessary to obtain a footing on the mainland of Asia before delivering the attack on Kyushu.

The naval plans included a series of attacks by fast carrier task forces during July and August on the Japanese mainland with the object of softening up and destroying the ability of the enemy to resist our landings. One British fast carrier task group was to take part in the major part of these operations.

The date set for the start of the operations was 15th October; these would culminate in the landing on 1st November on Kyushu. By this time a second British fast carrier task group was to be formed of which the air component would be provided by the new light fleet carriers which were just joining the Fleet. Both the two British task groups were to form part of the covering force under the command of Admiral Halsey, United States Navy, whose role it was to pin down the Japanese air force North of Tokyo and to prevent and disrupt the use of Japanese airfields in this area. This force would also engage any Japanese naval forces which might

[1] See also "The Projected Assault on Japan," p. 348.

attempt to interfere with the landing. It was estimated, however, that the available Japanese surface strength would by this time be small.

This combined British and American Force under Admiral Halsey was to be based on Eniwitok, in the Marshall Islands, thus leaving the Philippine area clear for the assault forces under Admiral Spruance. The British line of communications was to run Australia—Manus—Eniwitok. This change of base involved a large amount of planning and preparation at headquarters and in the Fleet Train.

On 28th June, the Fleet sailed from Australian ports to join Admiral Halsey in the preliminary softening up operations which I have mentioned. The Fleet Train was concentrated at Manus with a detachment at Eniwitok. Aircraft and stores were shipped forward from Manus and oil fuel picked up from the American supply system at Eniwitok. The lines of supply forward to the operating area were thus more than 2,000 miles in length. The first British strikes on the Japanese mainland took place on 17th July when the flagship, H.M.S. " King George V," carried out a bombardment in company with United States battleships. There followed a series of strikes against widely separated objectives throughout Japan, during which devastating damage was inflicted on what remained afloat of the Japanese Navy and Merchant Service. Admiral Halsey handled his Fleet in an extremely flexible manner. Primarily owing to the slow speed of our oilers, our supply arrangements were stretched to the limit, but though the margins were at times exceedingly small, we remained in the line. It was indeed a wonderful time for the Fleet Air Arm.

During these operations our Fleet worked in much closer touch with the United States Fleet than had occurred off Okinawa. They were in fact under the direct tactical control of Admiral Halsey, thus reaching the final stage of integration for which we had been aiming. Operations in the air were on a massive scale and undoubtedly made a large contribution towards hastening the Japanese surrender. On a big day, between 1,000 and 1,200 sorties were launched from American ships and between 200 and 250 from the British. Sixteen American aircraft carriers took part and four British.

In early August the Fleet was due to withdraw for replenishment. The situation was, however, clearly nearing a climax and the withdrawal was postponed, still further straining the services of supply. There followed the dropping of the atomic bomb and the entry of Russia into the War. On 10th August Admiral Fraser, now at Guam in H.M.S. " Duke of York," with Admiral Nimitz, decided that a considerable portion of our force must withdraw for logistic reasons. The remainder, including the flagship, H.M.S. " King George V," were to stay in the operational area and await what now appeared to be the inevitable surrender.

SURRENDER OF JAPAN

On 15th August operations ceased. Throughout the remainder of the month the Fleet continued to cruise off Japan whilst arrangements were completed for a formal surrender. At the end of August, H.M.S. " Duke of York," flying the flag of Admiral Fraser, H.M.S. " King George V," flying the flag of Vice-Admiral Sir Bernard Rawlings, and the other British units anchored in Tokyo Bay, thus ending for many a period of nearly two months at sea. On 2nd September Admiral Fraser, representing Great Britain, signed the instrument of surrender.

The sudden end of the War required a very rapid re-casting of plans, and those of us at headquarters had to do some pretty quick thinking. The light carrier task group then forming was divided into two squadrons. One, under Rear-Admiral Harcourt, was dispatched at best speed to reoccupy Hong Kong. The other, under

Rear-Admiral Servaes, was sent to join the Commander, 7th Fleet, at the Philippines for duty in connection with our prisoners in Formosa and at Shanghai. The Fleet Train was diverted to Hong Kong, which was reoccupied at the end of August. Invaluable help was also given there by " Shield " Force—the ground and constructional units of the Royal Air Force heavy bomber squadron, which at the time of the surrender were at sea on their way to Okinawa. The surrender of all the Japanese units in the Solomons area was received by General Sturdee of the Australian Army on board H.M.S. " Glory " at Rabaul.

Meanwhile, in Japan itself, the main pre-occupation of our ships was the release and transport home of our prisoners of war. The end of the War found the British Pacific Fleet the only major British organization in the Pacific and thus it fell to us to undertake the happy duty of transporting many thousands of prisoners of war and internees towards their homes. Three of the large aircraft carriers were fitted out for this work. All aircraft were landed and the hangars fitted out in Sydney with a hospital and accommodation for large numbers of men, many of whom were seriously ill as a result of their treatment in Japanese hands. Altogether some 50,000 people, citizens of the Empire of every colour and race, were moved in H.M. ships or in transports under our organization to a great variety of destinations. In all this the overall responsibility lay with General MacArthur, by then Supreme Commander, and the greatest assistance and co-operation was received from the American authorities acting under his orders. The British prisoners were, in the main, transported across the Pacific and landed at Vancouver and on the West coast of America. Large numbers of Australian troops were also brought back to their home country for demobilization, whilst some thousands of Indians were carried to Bombay. I think this work of the Fleet will long be remembered by many individuals in the East.

Finally, there remained the need to close the Australian base and transport the men there back to England. The headquarters of the British Pacific Fleet was established in Hong Kong in early 1946 and, by the middle of the year, the end of our activities in Australia had virtually come.

Thus ends the story. The whole business had been built up and again dismantled so quickly that I think the magnitude of the effort put forth by the Empire may not be generally realized. The end of the War found us with some 142 warships in the Fleet and 94 sea-going ships in the Fleet Train. There were some 500 first line aircraft, with 100 on ancillary services and a thousand in reserve. The peak figure in personnel was about 125,000 men. These figures were rising rapidly and by the end of 1945 there would have been 400 ships of all types, 900 first line aircraft and over 200,000 men.

THE BRITISH PACIFIC FLEET

As will be seen from the foregoing account, the British Fleet's part in the final stages of the Pacific Campaign took the form entirely of air and submarine warfare, and of bombardment of shore targets. No surface actions developed. It is a matter of great difficulty to disentangle the figures for damage inflicted on the enemy by British units. American estimates, however, appear to show that some 300 ships of all sizes, totalling 350,000 tons, were sunk or severely damaged by the British Fleet Air Arm and 200 enemy aircraft were destroyed. The great majority of this damage was inflicted in the final operation.

No estimate can be made of the total tonnage sunk or damaged by British submarines. Their main successes were the sinking of the cruiser " Ashigara " and the attack by midget submarines on the cruiser " Takao " in Singapore harbour.

The Fleet Train

I cannot conclude without saying a word about the Fleet Train, since the organization and scale of this force was something of a novelty in the British service. The Train was commanded by Rear-Admiral Douglas Fisher, who flew his flag in the depot-ship "Montclare." Under him was a sub-command—the Air Train, commanded by a Commodore and concerned with the supply, repair and maintenance of aircraft and the provision of air crews to make good casualties. In addition to the ships of the Train proper, a squadron of small escort carriers was assigned to the operational control of the Rear-Admiral Fleet Train to provide transport of replacement aircraft up to the Fleet, and air and anti-submarine escort for the convoys. The escort vessels consisting of sloops and frigates were also under his operational control.

The ships of the Fleet Train could conveniently be divided into two categories—those which provided mobile base facilities but did not generally proceed to meet the Fleet at sea, and those which were organized into a Logistic Support Group to replenish the Fleet at sea whilst on operations. The movements of ships in both categories were controlled by the Rear-Admiral with the object of ensuring that adequate supplies and facilities were always available to enable the Fleet to continue operations. In one important respect the Fleet Train was not self-contained. Experience showed that it was essential at the forward base to have at least one airfield where reserve aircraft could be held and flight tested.

I suppose the Fleet Train was almost the supreme example of the British genius for improvisation. A more varied collection of ships it is difficult to imagine. A great number were ships under charter, flying almost every Allied flag and manned by a large variety of nationalities. Not unnaturally in a good many cases, particularly with the oilers, their speed and performance fell below what was required. Nevertheless they did the job and never let the Fleet down. I know we all felt immensely grateful for their work and for the determination and sense of humour which carried them through.

The Australian and New Zealand Base

I would like to emphasize, too, the immense contribution made by Australia and New Zealand in providing the base. Some 123 ships were docked in Australia and 350 taken in hand for repairs of one sort or another, whilst a heavy programme was also carried out by New Zealand. I estimate that about 30,000 Australians were directly employed at the peak period on British Pacific Fleet projects, mainly in equipping airfields. I must also pay tribute to the immense hospitality and kindness which we received on all hands. I think all this must be of lasting importance in the affairs of the Empire.

CONCLUSION

It is natural to ask oneself what lessons the Pacific operations have for the future. In doing so I think it is more than ever necessary to-day to guard against the danger of drawing conclusions which are already outmoded by the march of events. Nevertheless, I believe that the move of the British Fleet from the Indian Ocean to the Pacific and its deployment against Japan is as fine an example as history can offer of the strategic mobility of naval power and in particular of naval air power. It is my belief that the conditions of the future will require that we develop this mobility and lessen our dependence on fixed and specialized naval bases. This will require

a close study of the system of supply and maintenance and a decision as to how far we can rely on improvisation when the time comes and what are the essentials which must be provided in time of Peace.

Though this mobility is so important in the forward areas, nevertheless a well-found rear base remains essential to the Fleet. We must, to-day, I believe, think in terms not only of a dockyard but rather of an area with an industrial background whose people are possessed of industrial skill. Docks and a knowledge of the repair of ships remain necessary requirements. But so too are airfields, an aircraft industry and factories capable of meeting at short notice the many changing needs of a fleet. In these respects we were well served in Australia and New Zealand, peopled as they are by men of our own race and outlook. We had, too, the immense advantage of a temperate climate where those engaged in supporting the Fleet could give of their best and from which the men of the Fleet could benefit on return from operations. This advantage is, I believe, of great importance viewed in contrast to the difficulties inherent in a rear base situated near the equator.

No single factor in the success of our operations in the Pacific was more important than the wonderful co-operation and sense of comradeship which we had with the United States forces. It was indeed a matter of the utmost pleasure to us all. I know I found that we could discuss our problems together with the utmost frankness. It was remarkable how similar these problems were, even though we might call them by slightly different names.

Finally I would like to draw attention to the part of our organization which affects the British Empire, for here I believe we were breaking new ground. For the first time a British Commander found himself commanding a force based on two of the self-governing Dominions. Furthermore, this force was a truly Imperial one and included substantial components from all of the large Dominions. It followed that the Commander-in-Chief found himself dependent not only on decisions of the United Kingdom Government, but also on decisions of the Dominion Governments, notably those of Australia and New Zealand in whose territory the base lay. In fact the Commander-in-Chief was in close day-to-day touch with Ministers in Australia while arrangements were made for him to be represented when necessary at meetings of the Australian Chiefs of Staff.

I think this development is a significant one in the evolution of our Imperial affairs, the more so because we are clearly witnessing to-day a considerable change in balance between the various members of the Commonwealth. I will not attempt to enlarge upon it further now, but I do commend it to your study. (*Applause.*)

DISCUSSION

CAPTAIN W. W. DAVIS, R.N.: Can you tell us the delineation between the commands of General MacArthur and Admiral Nimitz? Were separate naval units loaned permanently from Admiral Nimitz to General MacArthur, or were separate arrangements made for each operation?

THE LECTURER: General MacArthur's command was known as the South-West Pacific Area and included the Philippines, Dutch East Indies, Australia and the waters adjacent. Under his operational and administrative control was placed permanently a force known as the Seventh Fleet, whose strength was regulated from time to time by decision of the Joint Chiefs of Staff. In addition, units of Admiral Nimitz's Pacific Fleet were placed temporarily under the operational control of General MacArthur for particular operations, as for instance, the assault on Hollandia.

At the end of the War this system was in course of modification in preparation for the assault on Japan, when in general all naval forces were to come under Admiral Nimitz and all land forces under General MacArthur.

CAPTAIN LORD ASHBOURNE, R.N.: There is one question I would like to ask. It is not easy to answer, and I would only ask the Lecturer to give his opinion. He mentioned that the Japanese submarines were not very enterprising; but if our fleet had been confronted by German submarines in the Pacific, how much difference would that have made to our operations?

THE LECTURER: I think that operations could have been attempted by the same methods, but less continuously. I think we would have had to shift our replenishment areas much more drastically and keep the enemy guessing much more than we had to do with the Japanese who, as far as I could make out, never really realized what we were doing. But I think it would have been worth while attempting the operation by those methods, though the rate of striking would have been reduced.

CAPTAIN R. C. M. DUCKWORTH, R.N.: As I had the honour and good fortune to serve in Admiral Lord Fraser's Command as Deputy Chief of Staff to Admiral Daniel—the Vice-Admiral, Administration, I would like to say a few words in support of the Lecturer on the subject of providing the main base facilities for the B.P.F. in Australia.

In particular, I would like to mention the time factor. We arrived in Australia to start planning in May, 1944, but it was only at the Quebec Conference in September, 1944, that it was finally decided to send the British Fleet to the Pacific. Even then it was not until early November that the Australian Government were asked to go ahead with our plan for the provision of the main base facilities. That was only some six weeks before the Fleet arrived in Sydney, and this was much too short a time to get everything going. As examples, I would quote that the total coverage required for Naval and Victualling Stores was over four million square feet; this had to be providedl argely by new construction or by converting Australian wool-sheds. We also had to provide a R.N. Barracks to house 8,000 men, which, in fact, took six months to build.

The execution of the base plan would have been impossible had it not been for the great assistance and co-operation we received from all concerned in Australia. Admiral Sir Guy Royle, who was the First Naval Member of the Australian Commonwealth Navy Board, had served before the War with Admiral Daniel, and I had been at the R.N. Staff College in 1938 with Commander Burrell, R.A.N., who was Director of Plans in Melbourne. I emphasize this point because the fact that we knew each other and had worked together before, and the fact that the Dominions are represented in our R.N. Staff College, helped very largely in smoothing out the many difficulties which we encountered.

I should, therefore, like to take this opportunity of paying tribute to all those in Australia, and in particular to the members of the A.C.N.B. and of the Royal Australian Navy, who helped so much to make possible the basing of the B.P.F. on Australia.

CAPTAIN E. ALTHAM, R.N.: Can the Lecturer tell us a little more about the weather, because it must have been a very important factor in fuelling and storing at sea? And will he tell us also whether fuelling was done mostly underway or stopped?

THE LECTURER: Weather was never a very restrictive factor. The typhoons were the main difficulty. Their movements were very difficult to predict and they gave rise to a very heavy swell in all this area. Once or twice the United States forces ran into serious trouble with typhoons and certainly they were a source of considerable anxiety. But on the whole we were not restricted by the weather to any marked extent.

Oiling and storing were carried out entirely underway, steaming at a fair speed, and I have heard of as many as six ships being all buttoned together at the same time. There is no doubt that experience and practice in this made possible a great advance on pre-War ideas.

COMMANDER D. K. BUCHANAN-DUNLOP: At one time there was a rumour in the Fleet that we were to be diverted to lesser work with the United States 7th Fleet. Could you tell us if there was any truth in that rumour and, if so, the reasons for it if they can now be given?

THE LECTURER: There were, it is true, discussions going on regarding plans, most of the time. At one period, you are quite right, these reached quite an advanced stage, that we should be used down in the South-West area. That never eventuated. It fell to

me to discuss this matter with General MacArthur's staff and with Admiral Nimitz, and it was only too clear at once that it was not what was wanted, and it never got any further. But naturally plans are always being looked into for alternatives, but this was not an alternative.

THE CHAIRMAN

It is a great pleasure to me to be here to-day for many reasons. Your Chairman, Admiral Little, was Second Sea Lord when I was Third Sea Lord at the Admiralty at the beginning of the War, and I am always grateful to him for his counsel and advice, which a more experienced man gives when he is a great man in that sort of way. I also see Admiral Thursfield, who once worked me up when I was head of the Tactical Section of the Admiralty. And there is Captain Altham who was officer of my division when he was a Lieutenant and taught me a lot of things; and so I suppose, the result of all that is I stand here to-day. In addition I see many of my officers who served in the Pacific, including, I think, one or two of the Australian Commanders, all of whom it is very pleasant to see here to-day.

On going out to the Pacific there was no doubt in one's mind that whatever confidence appeared in one's face, it was going to be a very difficult task and one which we had never had before—that of being based on a self-governing Dominion; responsible to the British Admiralty, under American operational control, and that operational control consisting of two different independent commands. It was a situation of which one could well feel a little doubtful. What happened, of course, was that the Americans became great friends. Admiral Nimitz and General MacArthur were first class and co-operative in every possible way, and all of you who were out there know what marvellous things the Australians and New Zealanders did for us. We were in the position in Australia of not being able to give orders but, as it turned out, every request we made was considered by the Australians in the same light as an order, and it was always done in that way. At the end we had, perhaps, slight difficulties. The Australians were anxious about their housing position when their soldiers came back; the houses they needed had not been built because sheds and workshops had been put up instead. The situation of the Government might therefore be difficult. We had slight arguments on that position; whether it was better to build houses for returned soldiers or to get on with the War. But the whole attitude of and the kindliness and the hospitality on the part of the Australian and the New Zealand people to ourselves had to be experienced to be believed. If you had not seen it you could not believe it.

To-day one still gets letters from Australia; and the Australian people tell me that they get continuous letters from our own people about their wonderful time and the wonderful things the Australians did.

There was one question which might be interesting to comment on. There is often—what shall I say—some jealousy perhaps, between those who sweat and toil and those who strain and toil. The sweat and toil job is useful work in the fields or in the mine; and the strain and toil people are those who have perhaps rather more comfortable positions, but have to bear the strain. I have dealt in both. I have cut down trees in my own garden—but strain and toil is sometimes, and in the Services in particular, intolerable. Two of our First Sea Lords have died in office. My predecessor at the Admiralty died in office and my successor died. Fortunately I managed to slip through between them. Captains of destroyers in particular had a very difficult time. Thus the strain and toil man should not be looked upon simply as a chap who rides about in a motor car, and has a big cigar and a good time.

In our fleet in the Pacific we had a good scheme of working the business so that the Flag Officers and staffs got the necessary rest. In the day time operations Admiral Vian took charge. Then, at night, Admiral Rawlings, with his flag in the "King George V," took over control. When you got to the service area fuelling and provisioning and so on, then Admiral Brind of the cruisers took over the practice arrangements; and so we got a very good division of labour.

Shanghai
Formosa
Hong Kong
Lingayen G.
Subic B.
CHINA
SEA
Malacca Str.
Sumatra
Palembang
Borneo
Celebes
JAVA SEA
Fremantle

Aleutian Is.
Tokyo
KYUSHU
Bungo Chan
Shanghai
Nansei Shoto
Okinawa
Iwojima
Midway
Hawaiian Islands
Formosa
Sakishima Gunto
Hong Kong
Wake
Marianas Is.
Pearl Harbour
Subic Bay
Philippine Is.
Guam
Leyte
Eniwetok
Ulithi
Caroline Is.
Marshall Is.
Gilbert Is.
Ellice Is.
Manus
Rabaul
Solomon Is.
Celebes
New Guinea
SEA
BANDA SEA
Timor
CORAL SEA
Samoa Is.
Fiji Is.
New Caledonia
AUSTRALIA
Fremantle
Sydney
TASMAN SEA
New Zealand

There is one other thing I should like to mention, and that is the Air Force. We had the Transport Command out with us—about fifty Dakotas. They did a most remarkable job. They flew more hours, I think, than any airman had ever flown before. They flew through all conditions and they never failed us. We are very grateful to them for the work they did.

There is no doubt that the War in the Pacific was the greatest demonstration we have ever had of the necessity and the importance of sea power. The Japanese got command of the sea when they bombed Pearl Harbour and they spread all over that area—Singapore, Burma, etc.—and took that part of the World. And then Allied sea power came back again ; the Americans recovered their position with their ships and, as the ships covering the advance of the army and the air forces pushed forward, we saw the Japanese retreat from all the islands back to their homeland where they were finally defeated—all the effect of sea power. Indeed, before the atom bomb was dropped the Japanese were defeated.

Now by this I in no way belittle the other Services. It just means that if you have not got sea power you cannot use that power, but sea power alone is of little value either ; you must finally get on to the shore and to do this air power, co-operating with the fleet, safeguards the army and carries it forward. At the start sea power always is, and always will be, our first line of defence, but I do not wish to say that you could use that power without the full co-operation and help of the other Services. (*Applause.*)

ADMIRAL SIR CHARLES LITTLE : It has been very fortunate for us to have the former Commander-in-Chief of the British Pacific Fleet himself in the Chair to preside at this important lecture and we not only thank him for coming here, but also for the very valuable and interesting remarks he has given us.

I think we should like to take this opportunity to congratulate Lord Fraser on his new appointment : as you know, he is shortly taking up the Command at Portsmouth. We are glad that he will be there with his great experience at sea and with his great administrative capacity to help the Admiralty over the great problems which are in front of them at the present time. We thank you for coming here this afternoon and congratulate you on your appointment. (*Applause.*)

THE PROJECTED ASSAULT ON JAPAN

By Martin Halliwell

IF there had been no atom bomb, or if the Japanese warlords had not used the two incidents at Hiroshima and Nagasaki as a convenient excuse to throw in their hand, how would the War have been carried on? What was the next step? Should we still be at war with Japan now? Would the Allies have landed on the Japanese mainland direct, or on the China coast first to make a diversion? When was the landing to be?

These are all questions of interest to military strategists, and of particular interest to those who fought in other theatres against the Japs, often with a feeling of frustration that their own efforts in Burma and Indonesia did not seem to be getting anyone much nearer the final assault on the Japanese mainland which would obviously be necessary one day. Some British officers knew the codewords OLYMPIC and CORONET for the landings planned by General MacArthur, but details were few. Not many realized, either then or since, that these two operations would have been in manpower and resources the largest-scale operations of the War and, because of the vast distances to be covered between mounting bases and objective, extremely hazardous in execution.

General MacArthur's strategic plan for the reduction of Japan, codeword DOWNFALL, had been completed in Manila in May, 1945, and included the two operations OLYMPIC and CORONET of which the salient details were:

OLYMPIC

Landing Area—South end of island of Kyushu (the southernmost tip of the Japanese main islands.)
Object— To acquire and develop airfields for the support of operation CORONET.
Forces— One Army of four corps and Headquarters troops.
Date— Autumn of 1945.

CORONET

Landing Areas—(i) Sagami Bay, 50 miles South-West of Tokyo, and at other places round Tokyo Bay.
(ii) Kujukurihama Beach, 60 miles East of Tokyo.
Object— Capture of Tokyo/Yokohama.
Forces— One Army on each landing area, plus subsidiary Marine corps.
Date— Spring of 1946.

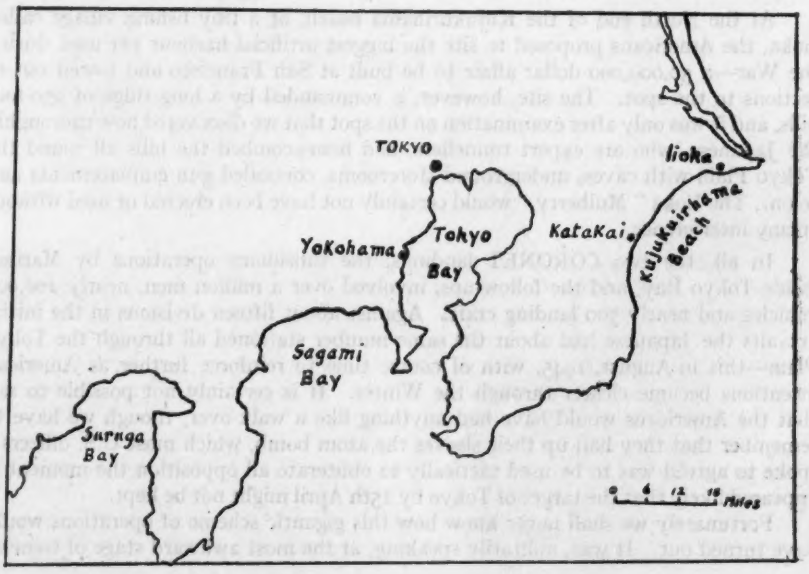
It will not be difficult with a map to get a picture of the strategy intended. The consideration which makes inevitable the choice of the Tokyo Plain (or Kanto Plain as the Japanese call it) is that this is the only area in the whole mainland of Japan where overwhelming mechanized land forces can be deployed to advantage. The rest of Japan, apart from the agricultural island of Hokkaido in the North, is a mass of intersecting mountain ranges and narrow, easily defensible valleys. Tokyo and Yokohama were the ultimate objectives and it would have been folly to put a large mechanized force ashore anywhere else and expect it to exploit across the intervening mountain masses in the short time at its disposal. This limiting factor was apparent to the Japanese too.

Before we examine what might have happened to these operations it is worth while to take a ruler and calculate the distances between the Tokyo Plain and the

only mounting bases available: for example, 1,000 miles to Okinawa (the nearest base), 1,600 miles to the Marianas; 1,800 to Leyte and Luzon in the Philippines; 1,800 to Ulithi Atoll; 2,400 to the Admiralty Islands; and 3,400 to Hawaii. Most of these bases are of limited capacity, and the timing of assaults to converge on their target from so many different and distant Pacific starting-points was bound to be the source of many headaches.

The preliminary OLYMPIC assault on southern Kyushu was to have been on three different beaches, one corps at each with a fourth as floating reserve—more than a dozen divisions in all with a vast quantity of stores and airfield construction material to bring ashore with them. Against them, according to the August 1945 dispositions produced by the Japanese and checked by American Intelligence, the Japanese opposed nine divisions, two brigades and two tank brigades—a formidable force when you realize that hills and mountains cover all the chosen landing areas, and that the Japanese had already shown themselves on Okinawa excellent mountain fighters, able to retire into deep caves and " sit out " the heavy air and naval bombardments with which Americans habitually preceded their assaults. On Kyushu too, they would have been defending their own homeland. Had the Japanese divisions been up to strength and their ammunition adequate, they might well have beaten back two out of the three American landings, and so greatly reduced the huge air force of forty groups which the Americans hoped to build up on Kyushu to support the main CORONET operation.

A secondary misfortune which would certainly have set back the preparations for OLYMPIC considerably, was the typhoon which swept southern Japan and Okinawa during September, 1945, destroying large quantities of landing-craft, planes and equipment of all kinds on Okinawa—a disaster no one could have foreseen but which would have had to be reckoned with. Among the planes so destroyed would most probably have been the three R.A.F. Lancaster squadrons which were to be based on Okinawa as our contribution to the air support of OLYMPIC and the strategic bombing of Japan.



We must assume, however, that all went well, and that in the four months available the Americans had established themselves and their aircraft on Kyushu. There was no question, incidentally, of using existing Japanese airfields, the concrete runways of which were much too lightly built to take our heavy four-engined aircraft without complete reconstruction. In the Spring of 1946, then, the main Tokyo Plain assault would have gone in on the two beaches mentioned. A date was chosen which would have been the last to give a reasonable chance of reaching Tokyo itself from the landing beaches before the melting snows flooded the intervening rivers and turned them into impassable, swirling torrents. Once more the same calculation had been made by the Japanese for themselves; in the hills behind the chosen beach on Sagami Wan, American Intelligence officers were shown by the Japanese preliminary clearings for launching a new type of catapulted suicide glider-bomb, to be guided by a human pilot so as to explode both himself and the bomb against supplies accumulating on the American beachhead about ten miles away. The ramps in these clearings, though unfinished in August, 1945, were correctly aligned towards the chosen landing area.

The morning of what was intended to be D-day of CORONET, I spent with some American officers in the village of Katakai, which was the point on the long Kujukurihama beach chosen for the first landings East of Tokyo. It was a most unpleasant day, with a 40-mile an hour North wind blowing icily down the flat beach, occasional sleet and long rolling breakers with plenty of surf. I do not doubt that the Americans would have achieved tactical surprise—one of the lessons of the War has surely been that such surprise for a landing is more common than one might expect—but 60 miles away in Tokyo it snowed continuously for several days thereafter, and the first few days of getting ashore and deploying mechanized vehicles across the sodden paddy fields would have been a most uncomfortable business under these sub-Arctic conditions. I suggested to one of the officers that he should collect a few shells off this fateful beach and send them to General MacArthur, who replied with a scribbled note: "Thank heaven these are our only souvenirs."

At the North end of the Kujukurihama beach, at a tiny fishing village called Iioka, the Americans proposed to site the biggest artificial harbour yet used during the War—a 50,000,000 dollar affair to be built at San Francisco and towed out in sections to the spot. The site, however, is commanded by a long ridge of 250-foot hills, and it was only after examination on the spot that we discovered how thoroughly the Japanese, who are expert tunnellers, had honeycombed the hills all round the Tokyo Plain with caves, underground storerooms, concealed gun emplacements and so on. The Iioka "Mulberry" would certainly not have been erected or used without enemy interference.

In all, the two CORONET landings, the subsidiary operations by Marines inside Tokyo Bay, and the follow-ups, involved over a million men, nearly 200,000 vehicles and nearly 700 landing craft. Against about fifteen divisions in the initial assaults the Japanese had about the same number stationed all through the Tokyo Plain—this in August, 1945, with of course time to reinforce further as American intentions became clearer through the Winter. It is certainly not possible to say that the Americans would have had anything like a walk-over, though we have to remember that they had up their sleeves the atom bomb, which most U.S. officers I spoke to agreed was to be used tactically to obliterate all opposition the moment it appeared likely that the target of Tokyo by 15th April might not be kept.

Fortunately we shall never know how this gigantic scheme of operations would have turned out. It was, militarily speaking, at the most awkward stage of General

MacArthur's preparations for OLYMPIC—while almost all his landing craft were back in the United States for refit—that the Emperor of Japan in his historic broadcast on 15th August threw in his hand. The first Allied troops to reach Japan were, in fact, 200 men of the U.S. 11th Airborne Division who were parachuted in on 27th August near Tokyo, and were followed by the rest of their division air-landed the next day.

The first band of 200 were greeted by the Japanese area commander where they landed with smiles, bows and those little deprecatory hisses of welcome in which the Japs specialize. They were led to trestle tables bearing 200 glasses of lemonade which they were pressed to drink; and we should perhaps all be thankful that this obsequious cheerfulness has been the keynote throughout of what has proved to be an occupation by consent.

SCIENTIFIC INTELLIGENCE

By Professor R. V. Jones, C.B., C.B.E.

On Wednesday, 19th February, 1947

Sir Henry T. Tizard, K.C.B., A.F.C., in the Chair

The Chairman: Dr. R. V. Jones, who is now Professor of Physics at Aberdeen University, was concerned before the War in some of the work which came under the survey of the Committee for the Scientific Study of Air Defence. About six months before the War, or a little longer, someone in the Air Ministry formed the very correct conclusion that a scientific man ought to be attached to the Intelligence Branch in the Air Ministry, and I was asked to suggest a name. I suggested that of Dr. R. V. Jones; and, after you have listened to him, I think that you will understand me when I say that I never had any reason to regret that recommendation.

Dr. Jones did great work during the War, much of which, naturally, cannot be published in any form; but he will tell us about such aspects of the general problem as he thinks that he can safely mention.

LECTURE

PUBLIC statements regarding Intelligence are very rare. One reason for this is Security: you cannot say much about your own Intelligence service—and particularly about its successes—without disclosing something of value to a potential enemy. But this is equally true of any statement you may make about any aspect of your Defence system, yet it has been found worth while for distinguished officers to outline the principles of their strategy and armament in the published lectures of your Institution. Our gain in having the views of successful commanders spread throughout our own country more than offsets the loss in Security. I believe, therefore, that it is not entirely for reasons of Security that Intelligence is so rarely discussed in public: there is a deeper reason. Owing to the inadequate status which Intelligence has hitherto been accorded in our Defence system, it has rarely been able to command a staff of mental calibre commensurate with the difficulty of its problems. As a result, while much thought has been given to the principles of strategy and while penetrating treatises have been written on that subject, a coherent philosophy or doctrine of Intelligence has so far failed to develop.

It is hardly surprising, therefore, that published opinion regarding Intelligence is, on the whole, derogatory. Take, for example, Clausewitz. While he says that Intelligence is the foundation of all a commander's ideas and actions, he goes on to state that "A great part of the information obtained in war is contradictory, a still greater part is false, and by far the greatest part is of a doubtful character." Shakespeare's King John, having been let down by his spies, expressed himself rather more tersely: "Oh where hath our Intelligence been drunk, where hath it slept?" And, knowing the two classic methods of Intelligence, he might well ask!

Despite, however, the hard things that have been said about Intelligence in the past, I believe that its development during the recent War was so vast that a coherent philosophy has now evolved. It is about this, in particular relation to my own branch—Scientific Intelligence, that I want to tell you this afternoon. My approach will be largely historical not only because, as Mr. Churchill has said, strict chronology is the secret of good narrative, but also because I know of no more convincing way of presenting the philosophy of Intelligence to you than along the path of direct experience by which I travelled myself.

It is appropriate that Sir Henry Tizard is our Chairman to-day, because it was also under his chairmanship, early in 1939, that the Committee for the Scientific Study of Air Defence first drew attention to our ignorance of new German weapons. It was therefore suggested that a scientist should be attached to the Intelligence branches of the Air Staff to find out what was wrong and whether an improvement could be effected. I was the scientist selected but, owing to Treasury opposition to the general proposal, the War broke out before I took up my duties on 11th September, 1939.

Eight days later Hitler made his famous " secret weapon " speech in which, in fact, he made no reference to a secret weapon. The subsequent alarm in this country was due to an error in translation, for it was clear from the B.B.C.'s record of his speech that Hitler was not referring to a specific weapon (*waffe*) but to the *Luftwaffe* as a whole. In the meantime it had become my task to search through all the Intelligence files for possible new weapons, and while the material in the files was very nebulous, I was able to indicate that certain weapons would have to be taken seriously: these included (quoting from my first Intelligence Report) gliding bombs, pilotless aircraft, long-range guns, and rockets. But my search through the files had also taught me how primitive was our Intelligence service compared with what, from a schoolboy onwards, I had imagined it to be.

At times of alarm, such as followed the outbreak of war and Hitler's speech, casual sources crop up in large numbers. These are mainly people who, under the stress of the situation, think that they have information of value to the country. Much of the information is useless, but in the days following Hitler's speech one casual source came up whose information was of remarkable interest. It happened in this way. Our Naval Attaché in Oslo received an anonymous letter telling him that, if we would like a report on German technical developments, all we need do was to alter the preamble on our German news broadcast on a certain evening, so as to say : " Hullo, hier ist London," instead of whatever we usually said. The writer would then know that we wanted the information and would send it to us. We duly altered the preamble, and the information arrived. It told us that the Germans had two kinds of radar equipment, that large rockets were being developed, that there was an important experimental establishment at Peenemünde and that rocket-driven glider bombs were being tried there. There was also other information—so much of it in fact that many people argued that it must have been a plant by the Germans, because no one man could possibly have known of all the developments that the report described. But as the War progressed and one development after another actually appeared, it was obvious that the report was largely correct ; and in the few dull moments of the War I used to look up the Oslo report to see what should be coming along next.

That was at the beginning of November, 1939. A month later I drew up my first report on the organization of Scientific Intelligence. I was subsequently to write several more, but they were rarely accepted. I asked then, as I have asked since, for a single Scientific Intelligence organization working on behalf of the Defence system as a whole. One reason for this is that many weapons are of interest to at least two Services. The Royal Navy was, for example, interested in the H.S.293 glider bomb because our ships were the target for that bomb, while the Royal Air Force had at least as great an interest in it because not only did it have to shoot down the aircraft carrying the bomb, but there were also many points of technique which we might with advantage apply to our own bombs. A single Scientific Intelligence organization, moreover, could probably have functioned with less staff than three

separate organizations—an important consideration in a country where scientists are scarce, as was ours during the War. A further reason was that, for reasons which I shall explain later, I believe that Scientific Intelligence requires a single head to direct it.

But the importance of Scientific Intelligence was not yet generally appreciated, and not merely did I fail to get an inter-Service organization but I also failed to get any help at all, not even a secretary. For myself, I had no doubt regarding the importance of the work. It seemed obvious to me that while Scientific Intelligence could not by itself contribute more than a fraction towards winning a war, a failure of Scientific Intelligence to detect the development of a new hostile weapon in time might well result in national disaster. This at all times was a somewhat terrifying thought, but it left no doubt about Scientific Intelligence being worth while. And while I even had to plead with my Director on several occasions to be allowed not to abandon Scientific Intelligence during the " phoney war " period, my own conviction regarding its value remained firm.

I conceived Scientific Intelligence, with its constant vigil for new applications of science to warfare by the enemy, as the first watchdog of national defence ; and to be a good watchdog it is not sufficient to detect the approach of danger—you must bark at the right time : not too early, for then your master becomes dulled to danger by too much barking, nor too late, for he may then be overtaken by disaster ; and you must not bark at false alarms.

My failure to obtain help in the early days had one interesting result, the significance of which I hardly realized at the time, although it coincided with the philosophy that I was already building up. To explain its nature I must first describe how an Intelligence organization works.

INTELLIGENCE ORGANIZATION

An Intelligence organization, despite the *Encyclopaedia Britannica* dig about there being three kinds of Intelligence—human, animal and military, resembles in fact a human head very closely. The sources of Intelligence correspond to the sense organs of the head ; the detailed resemblance here is in some cases remarkable, with photographic reconnaissance as the eyes and the radio listening service as the ears. The senses pass observations to the brain, where they are correlated, and a particular sound is associated with a particular visual object. In Intelligence, information from the sources is likewise fed to a collating centre, corresponding to the brain ; and while the brain, to be successful, must have a good memory, an Intelligence organization must also have a good memory built up of the individual memories of its staff and its filed records. So far no machine has been found to perform these functions nearly so well as a good human mind, and the design of an Intelligence organization must be such as to make it resemble a single perfect human mind as closely as possible. It follows from this that the most successful Intelligence organization is likely to be that which employs the smallest number of individual minds each of the greatest possible ability. For only then can you get those vital correlations of, say, a shadow on an air photograph with a fragment of a decoded intercept, or with a report or a sketch from a secret agent.

It has for a long time been appreciated that there are two functions of an Intelligence system, known as the " collection and collation " of information. These cover the functions of the human head so far as I have yet described them. They present an enormous difficulty in organization in that whereas information enters the Intelligence machine by source, it has to leave it by subject : it is this change-over inside the machine that causes all the difficulty. Air photographs, for example, were

taken by the Photographic Reconnaissance Unit, and then had to be sorted into categories of interest to the Navy, Army or Air Force. This is of course a simple case to illustrate what I mean; but in practice there are many other and more subtle cases which almost defy classification as peculiarly collection or collation functions. It is not surprising that in an organization which has to be expanded rapidly in wartime considerable confusion results.

Now, for me, this problem did not immediately arise. Since there was only one of me to do everything, I could not split myself into two separate halves. Orthodox Intelligence in this country is, however, fairly rigorously split, with Service Intelligence branches doing the collation duties and inter-Service sections doing the collection of information. This division of duties has drawbacks; notably there is insufficient contact between the Service users of the information and the actual sources of that information, and also there is no direct responsibility on any one organization to develop new sources. The collators cannot do it, because it is not within their terms of reference, while each collection organization can only deal with the kind of source for which it was originally set up. Now I, with my enforced duty as maid-of-all-work, was unfettered by any of these restrictions; and I found it of such benefit to break through them that I framed my later organization to take advantage of this fact.

Before proceeding with the narrative, I should like to say one thing more about the functions of an Intelligence system, the importance of which, unlike collection and collation, was not generally realized. With perfect collection and collation you may succeed in building up an accurate picture of what the enemy is going to do. But the test of a good Intelligence service in war is not merely that you were right; it is that you persuaded your operational or research staff to take the correct countermeasures. To do this it is necessary first to build up a reputation for accuracy and timeliness, so that from experience they find that they can trust your pronouncements. And, as I said before, it is not good enough to bark at the slightest approach of danger; you must first learn enough about that danger to be able to tell your operational staff what it is, so that they can take definite action. Otherwise you merely distract them with something that may not materialize. I have seen operational reaction to a new enemy weapon entirely vitiated because the Intelligence section concerned barked too early. On the other hand, if you are certain that you have correctly ascertained the nature of the danger you must spare no effort to ensure that the operational staff fully appreciates what is about to happen. If you pursue the policy I have described you will undoubtedly from time to time make yourself unpopular. You will at times be accused of hoarding information, and at other times you will be called an alarmist and will be told that you have no business to interfere with operational policy. But in the end you will be justified by events.

I may seem to have wandered a long way from my narrative, but most of these thoughts were growing in my mind during the " phoney war " period. I had already decided that, my first attempt at an organization having been rejected, I would go on alone to see whether I could prove my beliefs by practical demonstration. That demonstration came even sooner than I had expected.

THE GERMAN RADIO BEAM SYSTEM

In June, 1940, I received the culminating information on a trail that I had been following for some months, which led me to the conclusion that the Germans had developed a radio beam system for blind bombing known as *Knickebein*. They had taken care to disguise the receiver in their aircraft as being designed for blind landing,

but we managed to unmask its true purpose. The importance of this development was great. The evacuation from Dunkirk had just occurred, our air defences, while excellent by day, were almost impotent by night, and the whole of the German bomber force could come over then and drop most of its bombs into the area of intersection of the beams which were little more than half a mile wide over London. Thanks to the ready appreciation of Lord Cherwell and Mr. Churchill, who had recently become Prime Minister, steps were immediately taken to check whether I was right; and on the night of 21st June, 1940, a Royal Air Force search aircraft went up and detected the beams on the expected frequencies and in the expected place.

Even before we had finally found the beams we were starting countermeasures to jam them; this was the beginning of the radio war. When the beams came into serious use at the beginning of the night Blitz, there were enough jammers to upset them, and many bombs intended for such a large target as London fell in open country. There is a story that during this period, which lasted over two months, nobody had the courage to tell Goering that his beams were jammed, for he had said, after his defeat by day, that he would change to night attack by means of the beams, which were unjammable.

The chase of *Knickebein* was the best fun I have ever had—but it had its frights. It was here that I learned for the first time the danger of expert opinion in Intelligence. For the same facts as I had had about *Knickebein* were also given to a scientist outside Intelligence who was an acknowledged authority on the propagation of radio waves. He said that my solution of the problem must be wrong because it was impossible to make a short wave beam which would bend sufficiently round the curve of the earth from Germany to enable it to be heard in a bomber over England. He proposed an alternative solution which was obviously unfeasible on the Intelligence evidence but which nearly led to the cancellation of the vital flight that confirmed my solution. It was only the fact of Mr. Churchill's personal order that finally forced the search to continue.

Our own experts proved so repeatedly wrong in their opinions about new German weapons throughout the War, despite the fact that in their own fields they more often than not proved superior to their German counterparts (and that is one of the reasons why we won the War) that there must have been some underlying factor in their errors. In mentioning this I have no desire to demonstrate that I was better at my own job than were the experts who often tried to do it for me, except in so far as it may make the path of my successors in Scientific Intelligence easier. What was not realized is that the expert in this country on a particular scientific development is not the best man to interpret the information received from Intelligence sources. He is, in fact, not a collator—he is a source. He is that source who spies on the Laws of Nature in so far as they affect the weapon under consideration; he is a valuable source, for the Laws of Nature acknowledge no political frontiers. But he is human and fallible, as are all sources of Intelligence. If therefore his opinion conflicts with the Intelligence picture as built up from the evidence of the other sources, it is certainly a case for going over this evidence again. And if it still appears reasonably conclusive, then you must go back and query the expert's evidence just as you have queried the other sources. For this reason, which the expert can rarely appreciate, the final word must not be with him: it must be with independent scientists well versed in the art of Intelligence. It is on this argument that the case for an independent Scientific Intelligence organization largely rests. All my experience in the War convinces me that it is sound.

Returning to the Blitz, we had a hard fight with the beams during the last two months of 1940, after the Germans realized the fact that *Knickebein* was jammed. The cause of the trouble was a new beam system of even greater accuracy, employing an equipment with the intriguing title of the " X Apparatus." We soon found what the X Apparatus was, and how it worked. It was used by only one formation, *Kampf Gruppe* 100, which was intended to do precision bombing. But although we had discovered the correct frequencies on which to jam it, an unfortunate technical error rendered our jamming ineffective until almost the end of the year. In the meantime, the Germans switched *Kampf Gruppe* 100 to dropping incendiaries and so marking the target for the rest of the de-*Knickebeined Luftwaffe*. This was the beginning of pathfinding, which was later adopted also by Bomber Command. Coventry was the first target attacked by the new method, which caused a good deal of destruction until finally countered in January, 1941.

With the X Apparatus now out of action, the Germans tried their next trick with the " Y Apparatus." This time, however, we were particularly successful, because we had it entirely worked out in advance. This was partly due to one or two lucky guesses, and partly to the Oslo report, which I had decided to trust. Whereas the X system had depended on setting up crossing beams in the target area, the Y system used only one beam, down which the bomber flew. By a special new radio method its range along the beam from the transmitting station was found, and when the bomber had reached the correct distance it was told to drop its bombs. What the Oslo report told us was that the Germans were experimenting with such a method of range-finding (curiously the Oslo report had had no mention whatever of beams), and I guessed that the Y Apparatus would use this system. As a result we had several months warning of what was coming, and on the very first occasion on which the Germans decided to rely on the Y Apparatus for path-finding they found it jammed. Thereafter they were largely forced to coastal targets where they did not need any beams, and the main danger was temporarily over.

All this had demonstrated what Scientific Intelligence could do—at least for the Air Staff; and I was permitted to have some assistance. The main reason for my first helper was simply that at one time a good deal of the information had to be carried in my head, and I might well have got knocked out in the Blitz. Not that I ever wanted a large staff. For the reasons that I have already indicated I believe that Intelligence is best done by a minimum number of men of the greatest possible ability; and the staff that I gradually acquired certainly conformed to both these requirements. There were never very many of us, and we proceeded, as I had started, by running both the collection and the collation in one section.

THE OFFENSIVE

With the end of the Blitz we were able to turn our attention more to offensive Intelligence; by this I mean the production of information concerning the enemy defences for the benefit of our own offensive. It proved a more difficult task, for in the Blitz we had had a steady stream of prisoners, equipment and documents from crashed aircraft which would almost always, sooner or later, put us on the right track. In offensive Intelligence, however, all these sources were denied to us; and as an item of Intelligence I have had more regard for the work that we did in this direction than for that against the beams, although in many ways the latter was more dramatic.

In turning to the offensive I had to decide where our limited effort could produce the greatest result. The decision did not take long. I knew that most of our own

scientific effort was at that time going into radar development, and I knew also that our night defences depended very largely upon radar aids. As our bomber offensive, to which we were now committed, grew, it seemed very probable that the Germans would come to depend, as we had done, upon radar. In trying to find out about their radar we were therefore conducting a basic Intelligence attack upon the German defence system.

Enemy Night Defence Radar

As a limited objective, having regard to the slender means of Intelligence at our disposal, we directed our main attack first against the chain of German radar stations on the Channel coast, for these were within range of our photographic reconnaissance aircraft, and also they might be picked up by radio while they were transmitting. This twin thrust achieved both results almost simultaneously, for the Photographic Reconnaissance Unit obtained a low oblique of the first kind of German radar station almost at the same time as one of our officers first heard its transmissions in February, 1941. Having found the first one it was much easier to find similar stations, and as the year progressed we gradually built up our knowledge of the coastal chain.

The coastal chain was not of course the main belt of German night defences: they had still to be penetrated. But this penetration was going to be a good deal easier now that we knew the characteristics of at least one type of German radar equipment. We could then plan a wider attack. We could listen to the radio-telephony conversations of the German night-fighters which were now beginning to appear on a serious scale. We could analyse this traffic, although it was naturally as disguised by code language as far as the Germans could make it, and see whether we could deduce anything about the methods of control which the Germans were using. We could also take bearings on the transmitters and so find the position of the night-fighter areas. As many of these were in occupied territory, we could then brief friendly agents in that territory to look for radar stations similar to those on the coast; and then from the pinpoints given us by the agents we could once again send out our photographic aircraft to obtain pictures and special aircraft to listen for the radar transmissions. All our available sources could thus be swung into one big attack.

It is in the planning of attacks such as this one that I believe we made our biggest advance. That they were possible is largely due to the new kinds of sources that were available to us and which we developed ourselves as the War proceeded. Given any particular problem of penetration, we would survey our existing sources and see how they could be brought in to the new attack, and what new sources could be developed specially for this attack. New weapons often inspired new sources: radar, for example, almost automatically invited the searching aircraft equipped with a battery of listening receivers, and this soon developed into a regular source.

Our new sources were powerful ones. Moreover, they were generally "honest," requiring only courage, painstaking enthusiasm, and skill. Previously Intelligence had depended mainly on secret agents, the only source in fact for which I know of any Biblical precedent. You may remember that when Joshua attacked Jericho he sent in two spies to the town to obtain information. These men subsequently took part in the first "pick-up," or rather "let-down" operation, when they were lowered over the side of the wall in a basket. Unfortunately for the tradition of Secret Services, where did they stay in Jericho but at the house of Rahab the harlot? It is a tradition that dies hard.

The Bruneval Raid

I could easily spend the whole afternoon telling you stories of the Intelligence attack on the German night defences. I have only time, however, to select a few. The Bruneval raid, for example, was one of the thrusts in this attack—what the Germans themselves afterwards called "a violent technical reconnaissance by the English." It depended on a photograph, and this is the story behind it. After a chase extending literally from the Black Sea to the English Channel, one of my staff found a small speck on a photograph, so small that we had to examine several photographs to prove that it was not a speck of dust. We had found this speck by a process of deduction. We knew that the Germans had a new kind of radar equipment known as the *Wurzburg* apparatus, and we suspected that this would be used in some form for controlling night-fighters. We also guessed that it might be small—too small to be found without some external help on air photographs. Nevertheless, it was a good bet that the Germans would put it alongside some of the larger equipment that we had already discovered, and we therefore searched all photographs showing the larger equipment to see whether there were any likely specks. We ultimately found the one near Bruneval; the next stage was to get it photographed. But before we had time to put in an official request, our suspicions came to the notice of a photographic pilot—Squadron Leader Tony Hill, who promptly took off unofficially to have a look at it. He came back with the exciting news that it looked like what we had expected—a large electric bowl-fire; but he was disappointed that his camera had failed to work. He was about to take off again the next day, again unofficially, when he was stopped because three aircraft from a rival squadron were officially scheduled to be taking photographs in the same area at the same time. He thereupon taxied his aircraft over to the others and told them that if he found any of them within twenty miles of the target he would shoot them down. He then went out and got his photographs unmolested. They were among the classics of the War, and led directly to the Bruneval raid.

Tony Hill subsequently took nearly all the most dangerous obliques of the radar stations that we wanted, and we owed him a very great debt for his skill, courage and enterprise. Low oblique photography did not come easily to him; in fact he was originally rather slower than average, but by hours and hours of determined practice he made himself the greatest low oblique photographer of the War. It is one of the tragedies of Intelligence that good work by its sources can rarely be publicly recognized, but none of these unnamed sources would, I am sure, begrudge Tony Hill this recognition. He died in a German hospital of wounds received while photographing le Creusot on Trafalgar Day, 1942; it was a sortie so dangerous that he, as Squadron Commander, would allow none of his pilots to do it.

With Tony Hill there were many other fine pilots in the Photographic Reconnaissance Unit, many of whom did magnificent work for us. Facts are always better testimonials than adjectives, and I know of no more remarkable contrast in the whole War than the fact that the Germans did not achieve a single photographic reconnaissance of London, only fifty miles inside our coastline, from 10th January, 1941, to 10th September, 1944, while our photographic pilots brought us back pictures consistently not only from Berlin but also, on occasions when we asked for them, from Poland and from Bruster Ort near Konigsberg, where the Germans thought that they were secure in doing their flying bomb training. That is a true testimony to the skill and courage of our pilots and to the excellence of their aircraft; it is also a testimony to Fighter Command.

The success of the Bruneval raid finally depended on a R.A.F. Radio Mechanic—Flight-Sergeant C. W. H. Cox, who had never previously been out of England, on the sea, or in the air, but who volunteered for this dangerous operation and, after a short training, parachuted at Bruneval. In my final briefing to him I warned him of the danger of his being specially interrogated if taken prisoner, and above all to be careful of any German officer who was unexpectedly kind to him. He stood to attention, smiled and said: "I can stand a lot of kindness, Sir." I am sure that it was only his coolness and skill in dismantling the Wurzburg apparatus, which he had never before seen, in the dark and under fire, that made the Bruneval raid the outstanding success that it was. I mention this fact specifically, because a recent film, "School for Secrets," at least implies that it was all due to a civilian scientist. It is true that a civilian scientist did go (and several others volunteered to go) on the seaborne part of the raid, but none of us would like to steal the credit for the Flight-Sergeant's splendid performance.

Work of Secret Agents

While the Bruneval raid was spectacular, the work of some of our secret agents, notably the Belgians, was equally effective. Fired at by German sentries and unable to know whether their information was getting through or what we were doing with it, they nevertheless sent us information in enormous quantity. Of all the many gallant stories I can only select one about an agent whom I had asked to pinpoint some German searchlights for us. Instead of laboriously going round the countryside finding them, he broke into the hut of the German officer commanding searchlights over literally half of Belgium and secured his map showing the positions of every searchlight and radar station under his command. That was an enormous help. In fact it provided one of the most vital clues in the entire Intelligence picture.

One more story. Towards the end of 1942 it became clear that the Germans were at last putting radar equipment into large numbers of their night-fighters. There were one or two facts concerning the actual transmissions from this equipment that we needed to confirm. Accordingly one of our special search aircraft was asked to trail its coat in front of a German night-fighter to see whether it could hear the transmission. It succeeded almost too well; it was attacked eleven times by a night-fighter and nearly all the crew were wounded. The operator on the listening receiver—Flying Officer Jordan, was hit in the head by a cannon shell, but continued to listen and to warn the pilot of the successive approaches of the night-fighter. Our aircraft then limped home. The crew pushed their most wounded member out by parachute over Canterbury with the vital log of observations in case they should crash on landing. They then took their aircraft out over the coast again and came down in the sea, as it was in too bad condition to land. Fortunately they were all saved.

These stories are just a few of many that happened in the course of that offensive, which culminated at the end of 1942 in a complete knowledge of the German defence system as it was. It was a very great privilege to have developed that attack with such a great company of sources. From then on, we could say exactly what countermeasures were required and, as the German system changed as a result of these countermeasures, we were always able to follow and at times to anticipate it. Once we had found the scientific principles and technical details employed in the equipment of the German night defences, all the other Intelligence, such as order of battle, deployment and so forth, fell into place and we were given the final responsibility for fitting it all together. This is one of the reasons for the importance of Scientific Intelligence, because the scientific principles and technical details underlying a

particular equipment determine its tactical limitations, and these in turn determine its strategic application. Once you have discovered the scientific principles of the enemy's equipment, it is therefore natural that the way he employs it, i.e., his tactics and strategy, can then be understood.

The path of Intelligence, as usual, was not smooth. There were always people to challenge our interpretation of the evidence and to deny the danger of the German night-fighters. So serious did the situations become at times, when it appeared that only we in Scientific Intelligence could see the need of particular countermeasures, that I sometimes had to make vigorous appeals for countermeasures to be employed. It is a fact, for example, that Lord Portal of Hungerford, as Chief of the Air Staff, took me with him to the Prime Minister when the Air Ministry made its final fight to use " Window " in 1943. We had, of course, been fighting to have it used for at least six months before, because we could clearly see the mounting powers of the German night-fighters ; but we had a little difficulty in persuading Bomber Command that their losses were not mainly due to *flak*. And we had, moreover, found in December, 1942, that the Germans knew about " Window," but were frightened to use it themselves, so that there was no case against our using it for fear of teaching the Germans about it.

There were several reasons why I felt strongly about countermeasures. The first, of course, was that I did not want to see our bomber crews lost. It would have been invidious to avoid disfavour by acquiescing in the non-employment of " Window " when such an issue was at stake. A second reason was that I had a duty to the sources who had risked so much to enable me to build up the picture of the German night defences. I was not going to see their work wasted by inaction. There is nothing so demoralizing to a source than to see no action as the result of his work. On the other hand, to see direct action is often the only reward he can receive ; but it is the best of all.

On the whole, our orthodox Intelligence system has not realized this, its most important duty to its sources. I attribute this fact to the rigorous split between collectors and collators. It is the latter who have to present the Intelligence case to the operational staff and, as they never have personal contact with the sources, they have not such a lively appreciation of their responsibilities in this direction. I think that this is one of the greatest drawbacks of our orthodox system : I never allowed it to occur in mine. To keep faith with his sources should be one of the first rules of an Intelligence officer.

THE LONG-RANGE ROCKET

Fortunately for chronological accuracy, the back of the night defence problem was largely broken just as a new threat appeared. This was the long-range rocket. The Intelligence story behind this might have been perfectly normal, because the rocket problem could have been solved, as finally it had to be, by the application of what were now becoming our standard methods of attack. But, unfortunately, another Intelligence section, while correctly interpreting the early Intelligence reports as indicating a long-range rocket, nevertheless caused unending trouble by barking too soon. As a result, alarm was raised and it was widely believed in May, 1943, that London would within a few weeks be attacked by rockets weighing 80 tons with a 10-ton warhead. We, having the same facts, had raised no alarm at all, beyond telling a few senior officers that we were after the rocket at Peenemünde, because we did not know enough, and certainly nobody else knew enough, to take any counter-

measures. The thing to do was not to raise an alarm but to seek fresh facts—a phrase which might well be incorporated in the Intelligence officer's creed.

Once again we planned our attack and, although there is no time to tell you about it, we were delighted with the results, for by a very long shot we got right into the heart of German long-range weapon development. It is very doubtful whether we could possibly have taken such a long shot without our previous experience with the beams and the night defences. This incident convinced me more than anything in the whole War of the value of experience in Intelligence.

But long shots take a long time to hit the target, and in the meantime we had to proceed by more direct means. Peenemünde was photographed from the air and secret agents were insinuated into the army of foreign workers at that place. One of the photographs showed what was unquestionably a large rocket, and this almost clinched the evidence. But since some of our own experts had hitherto thought such a large rocket impracticable, they argued that it was a hoax to distract our attention from more important developments. Now if it were a hoax and it succeeded, we should probably be led to bomb Peenemünde; the Germans would presumably only tempt us to do this if Peenemünde were not a genuine, serious experimental station. I finally managed to show that this was extremely unlikely from an apparently insignificant piece of evidence gathered in quite another field. This was a circular to various German Air Force experimental stations, signed by a petty clerk in the German Air Ministry, giving revised instructions for applying for petrol coupons. Now all the experimental stations were on the list of addressees, apparently in order of importance, and Peenemünde was shown on the list above some other stations of whose importance we were certain. The clerk, who could hardly have known that his little circular would come into our hands, was in fact an unconscious witness to the importance of Peenemünde. It was, I think, Hilaire Belloc who drew attention to the importance of such evidence in historical analysis in his book "Six British Battles." The petrol instructions, to my mind, finished the case. They showed that Peenemünde was as genuine as our own Farnborough, and whatever hard things may have been said about the latter establishment, few of us would actually have liked to see it bombed.

The Bombing of Peenemünde

Following the Intelligence build-up, Peenemünde was attacked by Bomber Command on the night of 17th August, 1943. I see from Air Chief Marshal Sir Arthur Harris's book, *Bomber Offensive*, that there has been some controversy about the effect of this raid. Here are the facts. We killed their chief jet designer and we burned up all the production drawings for the large rocket just as they had been completed for issue to industry. The Germans, worried by the damage that we had done to their experimental factory at Peenemünde (and at Fredrichshaven, which had already been bombed on our advice) decided to put their rocket production underground and to move their experimental work to Poland. The culminating effect of all this must have meant several valuable months delay; but for this the rocket might well have preceded the flying bomb. We should have been subjected to a longer attack at shorter range (the rockets were never fired, as intended, from France), and our defences would have been worried by two kinds of attack at the same time. There can be no doubt that the Peenemünde raid was worth while.

THE FLYING BOMB

While we were investigating long-range missile development we found the flying bomb also being tried out at Peenemünde in competition with the rocket; it was a

much more recent project, but was making rapid progress. Fortunately we obtained all the details of its performance before Christmas, 1943, and Bomber Command could take all the necessary neutralizing action against the launching sites. We had sufficient detail to design fighter and A.A. defences, with the Americans specially making us some new predictors and fuses. The Americans told me that it was only possible to design these through the most detailed knowledge of the flying bomb's intended performance, and even with seven or eight months warning they were barely ready in time, so great were the difficulties involved. But before the campaign ended they produced remarkable results.

THE INVASION OF NORMANDY

Before the flying bomb came into operation we were to have a great deal to do with the return to the Continent or, as I preferred to call it, the reopening of the First Front. We had been looking forward to it for some time, our anticipation taking the form of hunting out all German radar stations, because we believed that it would be necessary to put them out of action before a successful landing. This locating of German radar stations was one of our hobbies, and during the War in all German-occupied Europe we found about seven hundred and forty of them, leaving not more than six to be discovered by our ground forces. Between Dunkirk and Guernsey—the Invasion area, there were one hundred and twenty pieces of major equipment; we found them all.

Our belief that it was important to put these stations out of action did not appear to be shared by the Invasion planning staff until very shortly before D-day. Fortunately when the decision to attack them was finally made we had the necessary target dossier ready; it could not have been ready had we waited for a directive from the operational staff. This was just another case where Intelligence had to anticipate operational needs. Considering the haste with which the operation was undertaken, its success was remarkable, and due mainly to the skill and courage of the rocket Typhoons of Numbers 20 and 22 sectors, whose accuracy in delivering attacks against such small targets was amazing. Barely more than ten per cent. of the stations were able to operate as D-day broke, and these were so shaken that they fell easily for a spoof diversion to make the Germans think that we were landing East of the Seine. It has rarely been mentioned, if ever, that all this effort was entirely British.

On D-day + 7, as we had anticipated, the Germans launched the delayed and much reduced flying bomb attack. Once again, knowing the nature of the weapon, we were able to have its likely line of production and supply. This led us to the *Volkswagen* Works at Fallersleben, which was knocked out by the American Army Air Force; it also led us to the main supply depots in France. These were mushroom caves, mainly in the Oise Valley. They were attacked by Bomber Command and the Americans; in one attack alone 298 flying bombs were irretrievably buried. During this period I was asked to take over all the Intelligence concerning the retaliation campaign, mainly because it was temporarily realized that, once you had the technical details of the weapon worked out, everything else was easy.

The rocket followed the flying bomb in September, 1944, but not before we had its performance completely evaluated; in no point, technical or logistic, were we more than 10 per cent. out, and generally very much closer. We were rather pleased with this because, as opposed to our own rocket experts' estimate of 80 tons total weight with a 10-ton warhead, we had predicted 12 tons with a one-ton warhead. We were not believed, but events soon proved our figures. That is one of the satisfactory things about Intelligence in war; you soon know whether you or your critics are right.

THE ATOMIC BOMB

The atomic bomb was an interesting Intelligence problem. In this we had to prove a negative case, one of the most difficult of Intelligence exercises, for you have to make such a thorough search before you can confidently say that the enemy is doing nothing. True, we found the Germans doing something early on, which caused us to knock out the Norwegian " heavy water " production. This, in fact, as one of their experts told me, prevented them from doing the vital experiment which might have convinced them that the atomic bomb was possible. As it was, they decided that the bomb was not practicable and so finally did little about it.

THE FUTURE OF SCIENTIFIC INTELLIGENCE

The German war then ended. From 1941 onwards, whenever the military situation turned in our favour, up sprang a crop of post-war planners who had chosen not to concentrate their energies on the war in hand. They hardly affected us, however, before the Summer of 1944; but with the Spring of 1945 they took great interest in our future. A committee was appointed by the Joint Intelligence Committee to examine the future of Scientific Intelligence. I was a member of that committee—the only one, with the exception of an Admiralty representative who had been doing Scientific Intelligence for the Admiralty for eighteen months previously, with any experience of the subject. And, remarkable as it may seem, few members of the committee had more than a few months experience of any form of Intelligence whatsoever. It is an almost incredible fact that, in a subject where experience counts perhaps more than anywhere else, personalities change in the Service Intelligence departments at a kaleidoscopic rate. In my seven years working in Air Intelligence, for example, I had five successive masters, and I believe that the other Services change heads of Intelligence at something like the same rate. The main question at issue was whether post-War Scientific Intelligence was going to be along the lines on which I had developed it, or was it going to be forced into the framework of orthodox Intelligence.

Despite all the facts to which I could now point to show that, while my system was unorthodox, it nevertheless produced the results when the orthodox method had failed, I was over-ruled; and in six hours the experience of six years was jettisoned. Scientific Intelligence is now done by three separate sections, one with each of the Services; none of them has the contact with the sources that I had. I doubt whether they have as good a contact with their own Services, for by a peculiar concession to my view that it really was one big job and not three parochial ones, the rest of the Committee decided that they should be housed together in inadequate premises in a remote part of London, near neither source nor Service. The heads work as a committee under the Joint Intelligence Committee which, nevertheless, not infrequently over-rules them.

Committees are not the way to run Intelligence. They have their proper uses, as Lord Hankey has pointed out in his Lees-Knowles lectures, and we must not forget that we owe our origin to a committee. But Intelligence is conducting a perpetual attack, and an attack needs a single commander; the annals of our Services have often proved that. Moreover, a committee cannot compile an Intelligence report—it can only go as far as common agreement will allow—and common agreement never goes far enough. An Intelligence picture is a work of art, and no committee has ever turned one out.

For these reasons, it became impossible for me and my staff to continue; we accordingly resigned as a last protest. Having had the fun in war, I was prepared

to go on in the duller time of peace, providing the system was running on the only lines that I believed offered hope of success, but obviously we were not the right people to make the new system work and there was much for us to do back in academic life. I, for example, have gone back and am helping to get a University physics department going again. I find it invigorating for, while it is not germane to the subject of this lecture, I am sure that it will cheer you to know that at a time when many foolish people are clamouring for forty-hour weeks, five-day weeks, closed shops and more pay, the University students, particularly those from the Services, are quietly working all their living hours in an effort to put this country back on its feet again.

I attribute the rejection of our system mainly to the lack of experience on the part of the people who rejected it. They had little experience because of the way in which the senior posts in our Intelligence services change so rapidly. And these change so rapidly because Intelligence has no proper status. It is not graded as a specialist job as is, say, Signals, and the Intelligence Officer is classed as "Administrative and Special Duties"—the lowest paid of all.[1] As a result, while our Signals organization is stable and has been characterized by some distinguished leadership, one of the main considerations of a General Duties officer in Intelligence is how long he will have to stay there before getting back to a post with better chances of promotion. It may be argued that Intelligence is too small a branch in that the top level could never be very high. One answer to this is to include all the Service Intelligence branches and all their ramifications into one large Intelligence service, with posts large enough at the top to offer a just reward for the kind of officer Intelligence needs —those with the greatest intellectual powers of any. This may be a long time coming, but I am certain that if we are involved in a future war it will be found necessary to amalgamate Scientific Intelligence again. I hope that this will be realized in time and, though any committee may now reject our philosophy, I am confident that this philosophy will outlast the committee.

CONCLUSIONS

I would like to summarize that philosophy here for the benefit of anyone in charge of Scientific Intelligence in a future war. It is, first of all, to remember that the truest criterion of a good Intelligence organization is its ability to plan, to carry out and to exploit Intelligence attacks. You must frame the organization to do these things with the utmost efficiency; do not be hidebound by any pre-conceived fetishes of organization in securing the objective. You must remember that Intelligence depends more than anything else on individual minds and on individual courage, and your organization should only provide a smooth background on which these can operate. You must employ as few links as possible between the source and the operational staff who make use of the information. You must never forget to stand by your sources: they will repay you. Do as much of the actual Intelligence work yourself as you can; you will find that you can then speak with increased confidence at the highest conferences, which you will certainly be required to do. The fact that you have done much of the work youself will give you a great advantage. Remember, as the cardinal principle of Intelligence, Occam's Razor, "hypotheses must not be multiplied unnecessarily."

Lastly, to anyone on whom my mantle may fall, I would say: remember Kipling's

> "If you can keep your head when all about you
> Are losing theirs and blaming it on you——."

[1] I believe that some improvement has now been made—R.V.J.

In a time of crisis you will find that a tendency to lose one's head is apt to appear at any level in administration. You will find yourself confronted with many frightening bogies conjured up by the agile imaginations of men often at higher levels than yourself. You will be unable to lay all these bogies at once, because to prove a negative case is one of the most difficult of Intelligence exercises. But you must find the simplest commonsense hypothesis and stick to it until a fresh fact proves you wrong, however eminent an authority is attached to another view.

You will find yourself blamed on the one hand for not telling everybody every conclusion you come to, even before you have thought of it, and on the other for indiscretion by the Security authorities (as I may be, after this lecture !). You will be accused of hoarding information, even though this is often a legitimate thing to do. And you will learn that in the Intelligence world there is an enormous premium placed upon going off at half-cock. The World seems to prefer a busy show of promptness to quiet, mature action, however timely. But you must never succumb.

In a crisis, you will find that these distractions may easily take up to 80 per cent. of your time. Your nights, or what is left of them after the work which you would have done during the day but for the distractions, will often be spent sleeplessly wondering whether this time you have not been too phlegmatic in decrying other people's flights of fancy or too rash in exterpolating from too few facts in forming your own hypothesis. But if in all this you can use the remaining 20 per cent. of your time in encouraging your sources, directing your staff, correlating the Intelligence pictures for yourself and presenting it in logical and clear reports, you will generally find yourself vindicated by events. And if you can persuade someone to take countermeasures in time, you may have the satisfaction of seeing danger averted for thousands of your unsuspecting countrymen.

The future of Intelligence is hard. In the past war, the nature of the weapons, the brilliance of the sources and the mistakes of our enemies all weighed the balance in our favour. It may well not remain so in the future. But though the futures of Intelligence may vary, and its methods change, the principles will remain the same. And if in that war our work helped to clarify those principles, this may well be its most lasting contribution.

By way of epilogue, I should like publicly to thank my sources. There were thousands of them : secret agents at Peenemünde, in the German night-fighter control rooms and on the flying bomb sites ; photographic reconnaissance pilots travelling thousands of miles alone above Germany or diving down for a perilous oblique ; girls in remote huts listening to German night-fighter radio-telephony ; photographic interpreters ruining their eyesight through poring over photographs ; aircrews in radio reconnaissance aircraft patrolling alone in the German night-fighter belt ; technical officers sieving the earth around crashed German bombers trying to find the vital clue and trying to read the burnt documents ; and many others. I, as their mouthpiece, had the limelight, but without them I could have done nothing. It is, as I said before, one of the tragedies that few of them get recognized, but we owe them much.

I would like also to thank my staff in public. Always fewer than the situation demanded and always stretched to their limit, they somehow kept the gaps patched. I cannot believe that the same number of men and women could have done more anywhere.

Finally, speaking as I so often spoke in the War, for both my sources and my staff, I would like to state what we all felt: that it was a privilege to be doing the work we did, helping the three Services and the Royal Air Force in particular, in their joint effort against Germany. Our final wish would be that in another emergency the armed forces of this country will be served by an Intelligence organization worthy of its tremendous task.

DISCUSSION

MAJOR F. A. YORKE: When you had a very important technical problem, did you find it reasonably easy to make the "higher-ups" understand it, or did you have to speak in hyperbole the whole time?

THE LECTURER: Frankly, I do not think that there was any real difficulty. Very naturally, the ability of individual officers to appreciate points varied, but we were very fortunate during the War, I think, in having at the top some officers who were extremely appreciative. The Prime Minister and Lord Portal of Hungerford supported us right through. Lord Portal had a great understanding of our problems, and we never had the slightest difficulty in explaining to him what it was that we were up against.

CAPTAIN E. ALTHAM, R.N.: I gather that the Lecturer has been dealing essentially with what we may call Operational Intelligence. I wonder whether his advocacy of a central Intelligence system would also embrace and link up what I would call Security Intelligence? Does that come within the scope of what you conceive to be the ideal?

THE LECTURER: I should say that it was on the fringe, to some extent. We did a bit of that during the War ourselves, and it is a fact that if you are yourself conducting offensive Intelligence in the way of finding information about the enemy, it very often happens that you are the best qualified—because you know what you do yourself in a particular circumstance—to say what the enemy will be likely to do in penetrating your own security. In fact, as Sir Henry Tizard will remember, we had that problem on one occasion. It is therefore a complementary arm, very definitely, where co-operation is very necessary.

I have a very open mind about whether it ought all to be part of one organization or not. Although I say that I am in favour of inter-Service organizations, I like to keep organizations as small as they can be made, as far as is humanly possible. In any case, I do not believe that I am the one to say whether or not it would be a good thing; I would rather leave that to the experts.

LIEUTENANT-COLONEL L. V. S. BLACKER: The Lecturer has divided his subject into the collection and collation of Intelligence. In my young days I was always taught that the dissemination of Intelligence was equally important. It would be very interesting to many of us if he would say something about the dissemination of Intelligence.

THE LECTURER: Evidently I have not made myself clear. I did say that important though collection and collation were, they were useless by themselves, and that it was not sufficient to build up an Intelligence picture; you had to persuade your Operations staff to take action on it. That is the point covered by your question about dissemination. The way in which you do that varies with the actual case involved. In my case I could give you many examples. It sometimes meant writing reports. Sometimes four reports altogether would be written; at other times four or five hundred. Those reports were written as soon as we had enough of the picture to give to the Operations staff something to bite on. We did not shoot over every item of information which came in, contrary to a practice which is quite common. There is a belief in Intelligence that you must get rid of the responsibility yourself and "pass the baby" to the Operational staff, so that as soon as any report comes in it is sent, uncollated and undigested, to the Operational staff who, as a result, have to do the Intelligence themselves.

Most emphatically, we did not do that. We regarded it as one of our jobs to screen the Operational staff from having every little scare report thrust under their noses to worry them when they were conducting operations. We had a picture, we tied it up as

far as we could, and then transmitted it. That was done mainly by reports, as well written as we could make them. They sometimes amounted to fifty pages, and at other times to half a page. They were illustrated with all the photographs and diagrams that we could get in, because to convey information by diagram and photograph is often very much quicker and easier to understand than by writing a lot of words about it.

At one stage, when we were very worried about the success of "Window," two of my officers went round all the stations of Bomber Command giving lectures. They did a hundred bomber stations in six weeks, a very fine effort, often doing three stations a day. Actually our own personal stake in "Window" was very high; we were determined to spare no pains to ensure that the crews knew why they were using it, and therefore two of my staff, though we could hardly spare them, went round to all those stations in that time.

This question of the dissemination of information is very important. We did it, as I say, by reports and by oral communication to committees, and so on. There was often a time when, in developing the Intelligence picture, things were going so fast that we could not write reports, and then we went to the appropriate meetings and told everything there, and made sometimes even daily statements on what was happening. In fact, we disseminated our information to everyone we thought could possibly use it, and we regarded it as due to our sources to see that it was disseminated as effectively as it could possibly be.

THE CHAIRMAN

We have all listened with great pleasure and profit to Professor Jones's interesting, informative and pleasantly provocative lecture. I have learned a great deal. Much that the Lecturer said was quite new to me. It shows how hard it is to keep in touch with these things in a war. Much that he did, and the way he did it, wants further study.

I notice a common trait with all of us—the feeling that one has when one tries to do anything of a lack of belief on the part of people who one thinks ought to believe. It must be a very common feeling where Intelligence is concerned. If you have to try to convince an intelligent person in ordinary life about a subject which is not secret, you can produce all your evidence and have an argument, whereas one difficulty of secret work is that you cannot produce all the evidence, except to a very few people; you must say, "Well, you must believe this," and if a man has a tendency not to believe he is encouraged in that tendency by not getting all the evidence.

Perhaps we can take comfort in the thought that, on the whole, experience in the last war proved that human difficulties were less formidable in this country than in Germany. I thought, as Professor Jones was speaking, that I should have liked to see him trying to convince some of the German Generals, or even the German Fuehrer, of the truth of his predictions. I think that he would have found it much more difficult than he did in this country!

The views which he expressed at the end of his Lecture on the development of Scientific Intelligence must be taken seriously. He has a more intimate experience of this matter than anyone I know, and I think than anyone else at all. I listened to his views with great interest; and, when I say that, it does not mean that I am going to forget them when I go out of this room.

The question of a central organization was mentioned. There is something to be said as a matter of organization—though it happened accidentally—for attaching Scientific Intelligence to the Service which, in addition to its own special work as a fighting Service, is the eyes of the other Services. If, therefore, we are going to have a Scientific Intelligence service common to all the Services, it may be that as a matter of organization the accident of its attachment to the Royal Air Force during the War will turn out to be the easiest way of dealing with it. I shall not ask the Lecturer to comment on that now, because it is a detail.

I ask you to show once more your appreciation of the Lecture. (*Applause.*)

ADMIRAL SIR CHARLES LITTLE (*Chairman of the Council*): Before we leave, I know that you would like to thank Sir Henry Tizard for presiding at this very important and scientific lecture. It is very appropriate that he should be in the Chair. As you know, Sir Henry has just transferred himself from Oxford to the Ministry of Defence in London: from the sunny skies and lovely buildings of Oxford to the grey skies and pneumatic drills of Whitehall. I asked him before the lecture why he had done that, and he said he had found that Oxford was rather a sleepy place. We can congratulate ourselves on the fact that he is in the Ministry of Defence, thereby guaranteeing that science is placed on a very high level in the thought of the Services after the War. We should like to congratulate him on his appointment and thank him again for presiding this afternoon. (*Applause.*)

THE TREND OF FUTURE WARFARE

By Lieut.-General Sir Giffard Martel, K.C.B., K.B.E., D.S.O., M.C.

THERE is general agreement that the invention of the latest forms of warfare such as the use of atomic bombs or of germ warfare will radically change the whole aspect of Imperial Defence. There are those who argue that they have heard these tales before, and they point to the fact that gas warfare or the use of great armoured forces did not materially change the principles of the defence of our Empire. It must, however, be remembered that there was always some degree of defence against gas, and that complete victory could not be gained at one stroke by its use. The same applied to the use of armoured forces. With the latest weapons, however, such as atomic bombs, it will be perfectly possible for one nation to destroy another nation completely in a few hours.

It is possible that every single person hopes that no nation will ever employ these terrible forms of warfare. It seems likely however that nations may well have to equip themselves with these new weapons so as to have the means to carry out the threat of reprisals and thus secure protection against this form of attack. We must therefore endeavour to deduce the kind of warfare that is likely to be used when these weapons are available. Atomic bombs and germ warfare can be carried out by the use of aeroplanes or by using rockets. It seems likely that rockets will be used in most cases. Every nation will have a number of rocket stations. At each station there will be a deep underground cavern containing the apparatus and the bombs. The rockets will be propelled up through a narrow channel into the air. The direction in which they are launched will be immaterial, for once they reach the air they will be directed by radar or other means on to the enemy industrial areas and main centres of habitation. It will be possible to launch a thousand of these bombs and thus destroy the greater part of the enemy nation. The rocket stations being deep underground will be almost invulnerable, so that if the enemy launches his rockets first his country can still be destroyed by the bombs possessed by the other nation.

It is difficult to believe that any civilized nation will initiate such a frightful form of warfare, but on the other hand there is every indication that nations will develop these weapons as a precaution while so little headway is being made by any international conferences to establish peace and security.

But, although no large scale attack with these new weapons may ever be launched, there is another form of warfare that is already in use to-day. This is the use of troops for infiltration purposes and propaganda against a potential enemy. It is obvious to the whole World that Russia has been using this form of warfare in the so-called peace period since the termination of the late war. The process is a simple one. Russia wants, we will say, some oil concessions from a neighbouring country. Russian troops therefore infiltrate in the country. Sometimes this is done openly. At other times the troops form cells in the forces of that country. They soon obtain a stranglehold over the people. Voting is closely controlled and a secret ballot is quite out of the question. In this way the part of the country that has been "invaded" becomes detached from control by their own people or the whole country may even become a puppet State under complete Russian control. All this is done entirely against the will of the people concerned, but they may well lack the necessary strength or determination to oppose such action.

The counter to these infiltration and propaganda tactics is quite simple. If the British Empire wishes to ensure that a nation which borders on the Russian Empire

shall retain the independence to which it is entitled, we must possess sufficient strength in light mobile forces of all three Services. If, at the request of the country concerned, soldiers are sent up to the area which is affected, the situation can usually be restored. The people were not prepared to stand alone against the Russian infiltration but, as soon as British troops arrive, they rally to the cause and the Russian tactics are nullified. There have been several instances in which the arrival of British troops has enabled a country or a part of a country to retain its independence in this way. Unfortunately we have not possessed anything like sufficient strength in these simple types of forces to meet our commitments all over the World. This is a form of military policing which has long been one of the main duties of all three Services in the British Empire.

It may be argued that such action is merely the prelude to war. It must, however, be remembered that a nation, such as Russia, may well be prepared to gain her objects by methods of infiltration, but would certainly not be prepared to go to war to attain her ends. Russia has at present great internal problems and would certainly not be prepared to launch into another great war, quite apart from the fact that she is well behind in the development of modern weapons such as those making use of atomic energy.

It is, therefore, clear that there are two definite and distinct roles which our forces must be prepared to fill. First comes the development and possession of the means of launching atom bombs or germ warfare from underground stations on to the industrial areas and centres of habitation of an enemy country. This will only require small numbers of men but they will have to be long-service. There will be no question of mobilizing such forces from the reservists. They will have to be mobilized and ready at all times, and this will present no difficulty because they will be so few in numbers. Secondly, we must have the police forces which we have always needed to meet our many commitments all over the World. These must be in considerable strength. It is bodies that count more than atom bombs for the purpose of stopping infiltration tactics. Also the troops must be first class men and highly trained. Here again there is no question of mobilization to meet a situation. The men must be there at all times or available at short notice to stop such tactics.

It will be asserted by many people that there is a third role for our fighting forces, and that it might well have been placed first and not last. This is to provide the nucleus of a military force of the type which would be used if a great war arose at the present time and before anyone is ready to wage atomic warfare. The Army would have to include all the heavy weapons, such as guns and heavy tanks and the inevitably large maintenance units which they require, also all the training establishments for this type of warfare and the schools and colleges for instructional purposes. A large reserve of trained men is essential for this type of war for mobilization, hence the Services have to use a large proportion of short-service men and conscripts to produce this reserve. This short service means that very large training establishments must be maintained to train relays of men, compared to the small task of training men when they remain for, say, 21 years with the Colours. We therefore see at once that the maintenance of the nucleus of a present-day large manpower military force is a formidable affair using up a large amount of man-power and financial cost.

What course have we so far taken over this vital and intricate matter ? We have accepted a compromise. We are attempting to maintain this nucleus, but our plans for the rapid mobilization of military forces of the present-day type are handicapped at every turn by lack of manpower and finance. For the same reason our military

forces abroad are far below what is needed to carry out the duties to meet our commitments in connection with military policing in various parts of our Empire. If we concentrated on the latter role we could have first class troops ready to carry out these duties and stop infiltration tactics and retreating from so many parts of our Empire. Of course the ideal would be to have these troops which are needed in considerable strength and, in addition, to have the nucleus of present-day forces on which to mobilize for a present-day great war. This would mean a great increase in our demands on manpower and finance and would be ruled out at once. Are we wise, therefore, in accepting a compromise over this matter or should we take a risk and drop the nucleus for great war forces and concentrate on those vital police forces ?

What risk would this entail. Is there any real risk of another great war in the next five to ten years ? It is difficult to see how such a war would come about. It is perfectly possible to reason that at some later stage tension will arise and that the risk of a great war will return, But surely no one will at that stage start to mobilize a whole nation and raise huge forces including hundreds of divisions in the army when the new weapons using atomic energy are there at hand. There are those who argue that " normal " forces will be needed at that stage in addition to atomic forces. They point out, for instance, that they will be needed to seize some territory on which to establish rocket bases, etc. It seems more likely, however, that by that time distances will be of little importance. The importance of distance is diminishing rapidly every day. It is difficult to see how normal forces will be of the slightest use when one or both sides start launching atomic bombs or germ warfare. Progress is advancing at an ever increasing rate ; few people realize the present-day speed. It would now be suicidal to look backwards.

On the other hand the risk in not maintaining suitable police forces for the every day defence of many parts of our Empire is very real. What a sigh of relief would arise from all our commanders overseas if they heard that they were to be provided with considerable forces of long-service and highly trained men. The forces would have to be very mobile and of a light and simple nature. The Army would use light armour and mobility more than heavy guns.

We have now come to the parting of the ways. Are we to try and continue to maintain a nucleus of the last war type of army and at the same time try to improve matters so that our commanders abroad may have better police forces to deal with their many commitments, or should we definitely accept the risk that we will be unprepared to raise a large manpower army of the last war type during the next few years in exchange for the ability of having a really good army abroad to carry out these police duties ? The latter course would mean that we would drop conscription and turn to higher pay and more amenities to attract volunteers. Many people take the view that the present time is not the moment for taking such steps in dealing with our manpower problems. At the same time it is well to examine the facts as they stand to-day.

Conscription is entirely foreign to our feelings and tradition and is only needed to enable us to mobilize a large manpower army in the event of another great war. But now the point will be raised that we shall not be able to obtain the volunteers for the long-service regular forces to carry out the police duties. Of course, we would have to pay them far more highly. It is probable that the same regulars could be used to man the rocket stations at home, thereby providing some degree of home service, but we would, of course, have to build far more married quarters for those on foreign stations. The saving effected in training establishments by using

long-service men is, however, so great that these expenses and a high rate of pay could certainly be met. A further saving would be effected by the increased efficiency of long-service men. If an officer is given a duty and asked if he will have five long-service men or ten conscripts to carry out the task he will certainly choose the former. This will result in a considerable saving in manpower.

The spirit of adventure is still very much alive in this Country. When men found that they could lead an interesting and exciting life abroad and have a well paid career for their life-time, a pension when they left the Services, and married quarters for their families, they would certainly join up as volunteers.

Although it may be considered inadvisable to do so for various reasons, it would therefore appear to be definitely possible to raise a very fine long-service army from voluntary enlistment to carry out our police duties abroad, and in the future the same personnel might well man the new types of weapons of war at home and abroad which are bound to materialize in the next few years and for which no large manpower army will be needed.

Before going any further, however, it would be well to see to what extent these proposals are affected by the two main principles that have always been accepted for our Imperial Defence.

The first principle is that each part of our Empire must be responsible for its own local defence. It must, however, be remembered that the minimum possible force must be used for local defence so as to leave the maximum forces available for concentration at vital points to carry out the main plan. Local security in each part of the Empire can therefore only be assured for a limited time, and additional troops may have to be sent to a threatened point as a reinforcement or for relief.

The second principle is that our main air and maritime communications must remain secure. This is the most important duty of the fighting Services. The whole existence of our Empire and the survival for more than a few months of this Country depends on these communications. Moreover, when we were considering the first principle it became clear that the ultimate security of a portion of our Empire might depend on the arrival of reserves, and this in turn depends on these communications.

It seems clear that these two vital principles will be maintained more securely when we possess first class military forces abroad to secure our position and to stop enemy infiltration tactics. Reserves of these light forces situated at suitable centres such as the Middle East will naturally be needed to support local troops when the necessity arises. In the past such forces have been supplied mainly by Great Britain, but it is now clear that the Dominions will have to take a larger share in this work. It is, therefore, more essential than ever that all the forces in the Empire should be organized and trained on similar lines, so that they can co-operate completely and easily on service.

Rocket stations of the type which were described earlier in this paper will no doubt be established in various parts of our Empire for use if the necessity should arise in a great war, but it seems likely that the police duties may play the most important part in our Imperial Defence in the future. It may be that these police duties will eventually be taken over by some international body, but our security for a long time ahead will depend on the efficiency and strength of our own forces.

It is, therefore, for consideration whether we would not do better to depend on long-term regular personnel for all our fighting Services and whether this might not result in a saving of manpower and financial expenditure combined with an increase of security in Imperial Defence.

FUTURE DEVELOPMENTS IN IMPERIAL DEFENCE

By Lieut.-Colonel H. R. R. Conder, O.B.E., Royal Norfolk Regiment.

RECENT announcements in Parliament have made it clear that within the next few years British troops will be withdrawn from Egypt (except possibly from the Canal zone), Palestine, India and Burma. The available evidence, in the form of statements by responsible leaders in these countries, points to the possibility that their attitude to the British Commonwealth in any future war will, at best, be similar to that of the Irish Free State in the recent one. It is the object of this article to consider what effect this may have on Imperial Defence under modern conditions and to suggest measures to meet these new circumstances.

The changes are such that the whole equilibrium of Imperial dispositions is likely to be affected. Three major factors of Imperial strategy are involved: the security of the Mediterranean route; the security of the Middle East and India; and the denial of naval bases, backed by adequate material resources, on the Indian Ocean to any other major Power. We will examine these in turn.

The Mediterranean

The importance of the Mediterranean to the Empire in the past has been threefold. First, it has formed a short cut for the passage of troops, material and merchandise from Britain to the Middle East and the countries bordering the Indian Ocean, thereby facilitating rapid concentration of effort and economy in shipping as compared with the Cape route. Secondly, in war-time, it has enabled the Empire to develop a strategy of exterior lines, or envelopment, in the European and Middle East theatres. Thirdly, it has acted as a barrier against attack on Africa from the North.

The events of the last war have shown that the first of these factors can only be relied upon in war-time if the enemy is denied the use of airfields and submarine bases on the Mediterranean littoral, or if the Royal Navy and the Royal Air Force are able to deploy overwhelming superiority in the zone. The second has proved of importance in both wars in that Allied detachments from the main effort have contained superior enemy forces (considering the theatre as a whole), and by their victories have produced a much needed stimulus to morale. Any doubt as to the importance of the third factor is dispelled by the account of the history of the Axis' naval and air effort, 1940-43, in the Mediterranean, given by Vice-Admiral Weichold —the chief German naval liaison officer in Italy. This account shows clearly that the success or failure of the Axis armies in North Africa was in direct proportion to the degree of naval and air effort devoted by the Axis to the blockade and neutralization of Malta and to the securing of their lines of communication across the Central Mediterranean. Rommel's army, like that of Napoleon in 1798, was defeated as much through British control of the Mediterranean sea and air routes as by the skill and determination of our land forces. The Royal Navy and Royal Air Force based on Malta played an important, possibly a decisive part in the defeat of the Axis armies in North Africa.

Imperial control of the Mediterranean has in the past been achieved through the continued retention of Gibraltar, Malta, and a port or ports in Egypt or Palestine as bases from which our ships and aircraft can operate. If any one of these links were destroyed, the Mediterranean route to the East would become inoperative unless France granted us free use of the naval and air facilities in her North African territories.

Let us now consider very briefly the effect of modern conditions on our use of this route in any future war. If Spain were actively hostile, Gibraltar could speedily be rendered useless by artillery firing from the hills West of Algeciras, irrespective of whether or not its garrison were overwhelmed. In both the last two wars, official Spain has been basically more friendly to the enemy than to Britain. Her financial position and the condition of her politics have, however, been sufficiently unstable in each case to preclude her openly declaring herself an active protagonist as long as there was any doubt of the final outcome of the war. It appears possible that similar conditions might obtain in any future war.

During the recent war, Malta was for a period completely neutralized as a result of enemy air attack and rendered useless as a base. The enemy, however, never pushed their advantage to the point of actual invasion, owing largely, it would seem, to a lack of proper understanding of naval strategy by their Higher Command. It thus became relatively easy for us to re-establish our position in the Central Mediterranean as soon as the enemy effort slackened. In any future war, Malta, and possibly Gibraltar also, would be an easy target for attack by atomic bombs or controlled long-range rockets. The target is clearly defined, limited in area, and distant from other territory; once it had been neutralized there would be no need for the enemy to risk loss of life from radio-active substances by physical occupation. The loss of either of these bases would make the continued use of the Mediterranean route hazardous in the extreme.

The Middle East

The Middle East is of paramount importance to the Empire as a source of oil fuel and as a centre of communications. It is by far the biggest oil-producing area within the British sphere of influence, with outlets both to the Mediterranean and the Persian Gulf. This oil is at present vital to the Empire for the maintenance of both naval and air forces in the Eastern Mediterranean and Indian Ocean zones. In view of the possibility that free access to the fuel from the Burmese oilfields may again be denied to us in a future war, this dependence on the Middle East oilfields is likely to compel us to fight for the retention of this area, should the necessity arise, whether or not this is desirable from other points of view, unless alternative sources can be found in Africa or Australia.

As a communications centre, the Middle East forms the focal point for land and air routes between Europe and the East, and between Asia and Africa. The Suez Canal provides the shortest sea route from the North Atlantic and Mediterranean to the Indian Ocean. The route through Syria and Trans-Jordan to Palestine and Egypt is the only approach to Africa from Europe and Asia which does not involve a sea passage. Further, through the Middle East and Afghanistan lies the historic route for the invasion of India. The events of the Japanese campaign in Burma and Assam showed that land invasion of India is also now possible from the North-East, but it is much more difficult; and whilst British sea power remains paramount in the Indian Ocean, it is likely that any future conquest of India would follow the traditional route by way of the Middle East.

A measure of the importance we attach to the Middle East can be obtained by consideration of the extent of our reactions in the recent war to the German attempt, abetted by the Vichy Government, to gain control of Syria, which led us to deploy a relatively large force at a time when it could ill be spared from Egypt to remove this threat; to the danger of a German penetration of the Caucasus in 1943, which led to the switching of troops from India to Persia in spite of the threat of Japanese

invasion of India; and, more recently, to the continued presence of Soviet troops in Northern Persia.

The Imperial interests in the Middle East have been safeguarded during war in the past by early reinforcement of the peace-time garrisons from the West from Great Britain, and from the East from India and the Dominions of South Africa, Australia and New Zealand. In previous wars reinforcement from Great Britain has been effected through the Mediterranean—the ability to use sea transport between Western Europe and the Middle East conferring on our forces the advantage of superior mobility as compared with the movement of the enemy's forces by land. As has already been mentioned, in the recent war this route was closed as a practicable one for reinforcements until the danger to our Middle East interests had already been removed by the final destruction of the Axis forces in North Africa. Supplies of men and materials could only be sent from Britain by way of the Cape, thus more than doubling the shipping tonnage required for the task at a time when shipping was in vital demand for the import of essential foodstuffs and of war materials from the United States. The effect of modern developments in air transport and in mechanized land warfare tend to discount this former superior mobility of sea transport for movement of reinforcements, particularly so if the Mediterranean route is unsafe for the transport of troops and if no aid is to be forthcoming from India. There is thus a danger that any garrison located in the Middle East at the start of a war might be defeated in detail before other Imperial forces could be concentrated to its aid, and that the continued use of the area as a source of oil fuel, as a communication centre and as a base might be denied to us. We will examine measures to counter this risk later.

The Indian Ocean [1]

Reference has already been made to the historical route for the invasion of India via the North-West Frontier. Before the recent war, India's military thought revolved very largely round the problems of control of the tribal territory and the defeat of a major invasion by this route, coupled with internal security arrangements. All former conquerors, emanating from Central Asia, have been land as opposed to maritime Powers. This, together with the manner in which historians have tended to throw emphasis on the land victories in the story of our conquest of India rather than on the sea battles which enabled us to reap the reward of those victories, has led many to regard India as a continental Power rather than a maritime one. The temporary loss of our naval supremacy in the Indian Ocean during the recent war, due to the Japanese capture of our Far Eastern bases and the diversion of the bulk of our naval and air forces to other and more immediately vital theatres, led to the destruction of much merchant shipping and the threat of invasion of India by sea, and drew attention to India's true strategic position as a maritime rather than a continental State.

India's growing industrial development is a major factor in the economy of the lands bordering the Indian Ocean, and, indeed, in future World economy. She possesses ample raw materials, and her industrial plant and technical skill have developed considerably recently under the impetus of war. These, however, will

[1] In this article it has been assumed, for the sake of convenience, that the future constitution of India will weld the sub-continent into a political unit. Any solution to the present constitutional problem that differs from this, as, for instance, the establishment of the territories of the Indian Princes as independent sovereign States, will necessarily affect the force of some of the conclusions reached.

avail her little unless she can be certain of the speedy and safe transit of her goods to foreign markets. The traditional trade routes through the North-Western passes to Afghanistan and Asia are too slow and difficult to take the volume of traffic required; the use of sea transport is essential.

It is remarkable that a country with such a long coast line as India should have so little maritime tradition. Whereas the Indian Army and the martial races of India are justly famous, until the recent war relatively few had ever even heard of the small Royal Indian Navy. Even then, whilst the Indian Army played a major role in many theatres, the Royal Indian Navy's contribution was only a very minor though none the less valuable one, and a very great part of the burden of defence of shipping in the Indian Ocean fell on the Royal Navy and the Royal Air Force assisted by Dominion and Allied navies and air forces.

India's geographical position, thrusting a wedge deep into the top of the arch formed by the territories bordering the Indian Ocean, greatly facilitated this task. Light, short-range ships and shore-based aircraft could be used for the protection of a considerable area, thereby facilitating concentration of an adequate fleet for protection of the more remote areas, for defence against invasion, and later to undertake offensive operations.

In the event of any future war that seriously endangers the security of shipping in the Indian Ocean, India is likely to be compelled to declare herself definitely either for or against us, unless she is prepared to accept possible heavy losses of merchandise during sea transit. The decision in such a case is unlikely to be a speedy one, and meanwhile, if India follows the example of the Irish Free State, our naval and air forces will be deprived of the use of Indian ports and airfields, though not, it is to be hoped, of those of Ceylon.

From the military point of view, the withdrawal of British troops from India will have some advantages in so far as it will result in a considerable economy in British manpower normally committed to the somewhat unprofitable task of internal security, but the loss of the practical training facilities on the North-West Frontier in policing the tribes, and of the value to be derived from sport and trekking in the mountains and jungles is to be much regretted during a prolonged peace, since these provide a very desirable spice of danger and afford good training in self-reliance and endurance. The more important aspect from a military point of view, however, of India's possible separation from the Empire, is the loss of the Indian divisions and units of Corps and Army troops that have done so much in the last two wars to ease our manpower situation. The maintenance in peace-time in India of a strategic reserve of nearly four divisions was also of the greatest value for the protection of Imperial interests in peace and war both in the Middle East and in the Far East. The loss not only of the manpower but also of the facilities for the positioning of this reserve will have a serious effect on Imperial security.

India and Burma are important as links in the chain of air communications from Europe and the Middle East to Australasia and the Far East. Whilst their role in this respect is not vital, any withdrawal of air transport facilities would very considerably increase the risk of air transit under present conditions of air navigation.

The Japanese capture of Burma early in 1942 deprived us of her fuel oil and other mineral resources. Except for a relatively small area in Borneo, these oil fields are at present the only alternative in the zone to those of the Middle East, though their known potential productivity is very much smaller. Unless other sources of oil fuel can be found or created synthetically in Africa and Australia,

the Burmese oil fields might become of very considerable strategic importance to the Empire.

Until the recent war it had been generally accepted that conquest of Burma was impossible except from the sea. The security of Burma was considered to be a matter of sea power. This theory has proved to be false under modern conditions; the security of Burma is dependent on land and air forces with their lines of communication secured by sea/air power.

COUNTER MEASURES

We have seen above that the main effect of the forthcoming changes in the structure of the Empire is on the security of Imperial communications. The events of the recent war have also shown that the existing concentration of a major part of the Empire's economic and manpower resources in Great Britain is dangerous to the security of the whole. Let us now examine what measures can be taken to restore the balance of Imperial defence.

Any scheme which would involve maintenance of large defence forces in peacetime can be ruled out in view of our manpower shortage and the necessity for directing as much labour as possible into industry. Similarly, the Empire is not in a position to afford any very considerable expenditure in connection with defence works unless there is likely to be some commensurate economic return for the expenditure in the foreseeable future.

In the past, the main burden of responsibility for Imperial defence has fallen on Great Britain. This can no longer be so in the future, if only because of the danger that attacks by long-range guided projectiles, or by atomic bombs, or the development of bacteriological warfare on the highly concentrated target of the British Isles might result in the elimination of Great Britain's war potential at an early stage of the war. Modern scientific developments make the adoption of the principle of the equal participation and joint responsibility of all the Dominions in Imperial defence an essential condition of survival as a Commonwealth—"United we stand, divided we fall."

To implement this policy, the main essentials are a redistribution of manpower and industry in order to reduce the degree of concentration in the British Isles whilst increasing the resources of the Dominions and Colonies, and the securing of communications between all the components of the Empire.

Redistribution of Resources

If Europe is ever again to form a theatre of war, the British Commonwealth will be in the anomalous position of having its main reserve already in the front line. In past wars this arrangement has been of little consequence owing to the defensive value as an obstacle of the English Channel, coupled with our naval supremacy; indeed, it has had definite advantages. Modern scientific inventions of long-range weapons have, however, tended very greatly to reduce, if not completely nullify, the effectiveness of this sea barrier against attack on Britain's manpower and war industries. There is a danger of the loss or effective neutralization of the main reserve in the first few days.

State immigration schemes have not always proved very satisfactory in the past. In the light of such past experience, and with the degree of State control of industry that is to-day accepted almost without demur, it should now be possible, however, to overcome former difficulties. Furthermore, the feeling of frustration

that is experienced by many in Great Britain to-day should provide fertile soil for the recruitment of volunteers. A relatively small proportion of the emigrants from Great Britain are likely to be agricultural workers; the great majority will be from industrial concerns. Suitable industries must, therefore, be established for them by Government direction in the Dominion or Colony to which they are to emigrate. State-directed emigration on these lines should ensure a proper livelihood for the emigrants in their new country and an increase in the industrial capacity of that Dominion or Colony as well as in its manpower; it would reduce the strategically dangerous concentration of manpower and industry in Great Britain and thereby make possible an increase in the proportion of Great Britain's agricultural self-sufficiency, at present at a dangerously low level; and, finally, it would strengthen afresh the ties between the Empire and the Home Country, ensuring that the white populations of the Dominions and Colonies retain their predominantly British character.

Safeguarding of Communications

The second essential in the furtherance of the principle of joint Commonwealth participation in Imperial defence is the securing of our communications in order to enable the necessary defensive forces and war material to be concentrated rapidly and maintained in action whilst the Empire's full war potential is being developed, and in order to permit the safe passage of merchandise with which to pay for the goods we must purchase from others. The probability that the Mediterranean route would be denied to us has already been discussed, as has the possibility that the use of the Middle East, India and Burma might be so also. What alternatives are left?

Study of the map of the World forces the conclusion that Africa is now becoming the keystone of Imperial defence. In itself, it is a continent of great, and as yet hardly touched, natural resources. It possesses great depth from the point of view of defence, and access to it from the North is only to be obtained by crossing the Mediterranean or the deserts of the Middle East. In the recent war, we were compelled to use the route via the Cape of Good Hope for all movement, other than air transit, between East and West. This was a heavy drain on our shipping resources owing to the length of turn-round and for that reason is to be avoided in the future if possible. There appear to be two courses open here: first, to link the railways of Nigeria from Bauchi with those of Uganda at Entibbe through the Cameroons and French Equatorial Africa. This would be an expensive project initially, but ultimately might pay its way economically by developing this previously untapped area. Considerable expenditure would be necessary also to develop Lagos as a major port. The alternative is the improvement of Walvis Bay as a port, the linking of its railway to Grootfon with Livingstone in Southern Rhodesia and the proper linking up of the Rhodesian railway system with that of Tanganyika and Kenya. This project would probably be cheaper financially, more immediately remunerative economically, and it should be sufficiently remote to be reasonably secure from possible enemy interruption, which might not be the case with the first project. On the other hand, it imposes an additional 2,800 miles on the turn-round of shipping as compared with Lagos. This, however, is probably to be accepted in view of the other advantages, particularly so if we are to accept as normal the use of air transport for personnel and light equipment between Freetown, or perhaps Lagos, and Kenya.

Now to turn to the sea routes in the Atlantic and Indian Oceans. The experiences of the recent war have shown the importance to our security of denying to our enemy the use of bases in Iceland and the Azores whilst by treaty securing

their use for ourselves. In any future war this necessity is likely to be the same and our diplomatic policy must be shaped accordingly. For the rest, provided we can rely on the active alliance of French West Africa, the Empire's resources in potential air and naval bases in the Atlantic should be adequate. Failing such co-operation, however, Gibraltar might again become dangerously isolated and possibly neutralized, making it necessary for us to obtain by treaty a base in Madeira or the Canaries in order to watch the western exit from the Mediterranean. In addition, a base for light naval craft and airfields in the Cape Verde Islands might be required in order to ease the problem of protection of shipping between West Africa and Brazil. The acquisition of such bases would avoid the need to divert shipping further West, where Burmuda and the West Indies are otherwise available as bases for the protection of our shipping lanes.

In the Indian Ocean the groups of British-controlled islands stretching eastward towards Australia and the East Indies, and north-eastward towards India and the Middle East form valuable stepping stones for aircraft and light naval craft engaged in protection of our shipping routes.

The "island strategy" should result in considerable economy of land forces. The military garrisons can be kept small, since any attack must first destroy the naval and air forces forming the first line of defence; if these are defeated the ultimate fate of the garrison would be sealed, failing relief by a major task force, and it would therefore be uneconomical to commit large numbers to such garrisons, as they can be better used elsewhere. The success or failure of this strategy will lie in the maintenance of a properly balanced fleet of sufficient size to defeat, in co-operation with the island-based naval and air forces, any enemy forces deployed against these island bases. Such a fleet must be strong in carriers in order to be able to impose an adequate degree of air superiority over the area, and these will in any case also be necessary to give air cover to the fleet when operating in areas remote from the island bases. That such a fleet must have secure bases where repairs can be effected unmolested by enemy attacks is evident, as is the fact that these are unlikely to be available in Great Britain and must, therefore, be prepared in the Dominions and Colonies backed by adequate industrial resources.

Counter-Offensive

As in all past wars, the Empire would undoubtedly be compelled to adopt a defensive strategy at the start of any future major war, whilst industries are turned over to war production and our forces concentrated. Ultimate victory can only be secured, however, by offensive action and the capture and subsequent retention of the initiative.

The "island strategy" outlined above is a policy rather of withdrawal from the enemy than of preparation to close with and destroy him. This strategy must therefore be linked with measures to retain military control of adequate "spring-boards" for the necessary counter-offensive. The closer these areas are to the enemy's centres of war industry and communications the more effective they will be.

Hitler correctly likened Great Britain to an aircraft carrier anchored off the coast of Europe. Britain's geographical position makes her an ideal spring-board for operations in Western Europe, and her defence in the early stages of any future war must be organized to secure her for this role in the later stages. The achievement of this is primarily a question of security of sea communications, adequate air cover and a heavy concentration of A.A. defence, coupled with dispersions of resources of men and material. A relatively small but highly mobile, hard-hitting force to

counter-attack and destroy any enemy land forces that may succeed in gaining a foothold will also be necessary. It is not intended to discuss this further in this article.

In the last two wars the other thrust of the Empire's final concentric attack has been launched from the South. It would seem that this must also be so in any future war in Europe or the Middle East. The counter-offensive must be developed from Africa in conjunction with that from Great Britain. For this, there appear to be three main requisites. The first is the maintenance in peace of sufficient forces in the Mediterranean basin—in Gibraltar, Malta, Cyprus and the Suez Canal zone—to maintain a British sphere of interest free from peaceful penetration by possibly hostile Powers, and to give effect to insistence on treaty rights in checking any such penetration of Egypt, Trans-Jordania, Saudi Arabia, Iraq and Persia. In this manner adequate depth can be acquired outside Africa itself. Such forces should be kept as small as the task permits since there is obviously the danger that they may become isolated early in the war and possibly defeated in detail. The second requirement is that such forces should be capable of rapid reinforcement from a suitably situated base if the conditions are favourable for a local offensive at an early stage of the war. The proper location of this strategic reserve is a matter for detailed reconnaissance and planning, but it would seem to be somewhere between the highlands of Kenya and Southern Rhodesia. As a corollary, adequate communications must exist for the reinforcement of such garrisons, or for their temporary withdrawal and concentration with the main force. These communications must be so planned as to be suitable for development as the lines of communication for the eventual counter-offensive to be developed from the African Continent either across the Mediterranean into Southern Europe or through the Middle East.

The eastward communications of this strategic reserve are also of importance in order to make it possible to move forces to secure essential resources in Burma, Malaya or the East Indies should this become necessary in order to counteract the loss elsewhere of vital supplies, such as the oil fuel from the Middle East.

Conclusion

To summarize: the forthcoming changes in the Empire and the effects of modern scientific discovery are likely in any future war to necessitate the Empire's main lines of communication being shifted farther South than has been the case in the past, not only as in the recent war as regards the Mediterranean route, but also in the Indian Ocean. It has been suggested that this can best be implemented by adherence to our traditional strategy of dependence on sea power, coupled with its modern counterpart of air power, based on a system of island bases spreading outwards from Africa, which is to be regarded as the keystone of Imperial defence and communications. To avoid the crippling losses due to possible attack by atomic bombs or bacteriological warfare on Great Britain, increased dispersion of manpower and manufacturing resources throughout the Empire is essential, or there is a risk of losing any future war within a few days of its start. This, in turn, makes maintenance of secure communications of paramount importance in order to provide mobility for concentration of war material and the land and air striking forces.

Finally, though it may be anticipated that our strategy will necessarily be defensive at the start of any future major war, yet ultimately we must pass to the offensive on land from suitably placed forward bases in Great Britain and North Africa. Whilst depth for the defence of such springboards is problematical in the case of Great Britain, since its existence will depend on events in Western Europe,

we are in a position to secure it in the case of Africa by maintenance of small but highly mobile land, sea and air forces at Gibraltar, Malta, Cyprus and in the Suez Canal zone. These must be capable of rapid support from an Imperial strategic reserve located in East Africa. This Imperial strategic reserve should comprise the bulk of the field force of the Army and Royal Air Force from the United Kingdom together with formations from the Dominion forces. It must be capable of being moved quickly either North, East or West along secure communications.

THE GERMAN NAVY IN DEFEAT

By CAPTAIN J. CRESWELL, R.N.

THE year 1943 saw the German navy beaten. By May the sinkings of Allied shipping had dropped sharply to a figure that was easily exceeded by new building. At the same time the destruction of submarines had risen to a degree not to be borne. By the end of the year the " Tirpitz " had been crippled by midget submarines, the " Scharnhorst " had been sunk, and the convoys to North Russia were getting through with almost no losses. By the end of the year, too, the Germans were finding it almost impossible to protect adequately their vital coastwise traffic in Northern Europe against our Air Force and Coastal Force minelaying and the assaults of Coastal Command aircraft.

The thoroughness of our success was not, of course, fully evident at the time. In none of these aspects of warfare could we relax, for the enemy continued to strive for new devices with which to reverse the decision. But, though he kept us battling to the end, he was never again within sight of the success which had at one time seemed almost within his grasp; and when the War ended we could already look back and see that 1943 was the year of our victory at sea.

If there were any lingering doubts on this point, they have now been dispelled by a translation, issued jointly by the Admiralty and the U.S. Navy Department, of the minutes of *Fuehrer Conferences on Naval Affairs*, 1943. These are the minutes written by the Commander-in-Chief, Navy, after every meeting with Hitler. During the year there were twenty-one such conferences, several extending over two days or more. The first was Raeder's last. Thereafter he was succeeded by Doenitz, promoted from the post of Admiral of Submarines. Included with these documents are Doenitz's minutes of several meetings held during a visit to Rome in May, and his notes on the many comings and goings, decisions and counter-decisions, at the time of Italy's collapse in August.

When the year opened the submarine campaign was still going well enough. December, 1942, had been rather a poor month for the Germans, but that could be put down to the gales of mid-Winter and some natural relaxation after the great efforts of the Autumn. Sinkings could be expected to mount again and faith in the submarine was still strong. It was this faith, in conjunction with the recent and lamentable failure of the " Hipper," " Lutzow " and six destroyers to inflict any damage on a convoy to Russia, that struck the key-note for the first of these conferences. Hitler talked for an hour and a half, sketching in the entire history of the Prussian and German navies, going back to the Danish war of 1864 and working up to a diatribe on the uselessness of big ships in the hands of the German navy. It must have been an uncomfortable conference for Raeder. " The Commander-in-Chief, Navy, rarely had an opportunity to comment." But Hitler certainly had some justification in the immediate past, for the " Hipper's " powerful force (she had 8-in. guns and the " Lutzow " 11-in.) had been ridden off by five British destroyers and then put to flight by the 6-in. cruisers " Sheffield " and " Jamaica," the German Admiral fearing that the British battlefleet was close at hand. And Raeder stated that these ships had acted in complete conformity with their orders.

Hitler demanded a programme for paying-off all big ships for the better advancement of the submarine campaign and other activities. He indicated as a partial alternative the possibility of converting some of the ships into aircraft carriers and wanted this examined. But he does not seem to have been prepared to force his

views to their full scope; and in the event he listened to the naval arguments for keeping some heavy ships in northern Norway. Only the "Hipper" and the 6-in. cruisers "Leipzig" and "Koeln" were paid-off. But Raeder went, and Hitler continued to reiterate his opinion that nothing worth while would be done by the big ships.

How much justification there was for Hitler's view, taking the War as a whole, is an interesting question that can be debated from many angles. It is the question of how profitable a part can be played by a battlefleet which at the start is in marked inferiority to its enemy. The piecemeal employment of German heavy ships in this War, though it had caused us much trouble, had failed ignominiously. How much this strategy derived from Hitler's interference and how much from Raeder and his staff will perhaps be made clear when the minutes of the naval conferences of 1939–42 are published. But had there been more restraint and more preparation in the early years, and had there been an eventual concentration of the "Tirpitz," "Bismarck," "Scharnhorst" and "Gneisenau," accompanied by the aircraft carrier "Graf Zeppelin" and backed by a strong force of shore-based naval aircraft, we might well, if luck had been against us, have been faced with a perilous situation.

In connection with this question of how Britain might have been defeated at sea despite the original strength of her battlefleet, there is one episode referred to later in these minutes that extorts a grudging sympathy for Hitler (supposing one can forget that he was fundamentally evil) and makes more understandable the exaggerated respect in which his judgment was held by many of his advisers. There is little doubt that the greatest danger to the Home Fleet in 1939 and 1940 was a strong offensive by torpedo-aircraft. This was, in fact, realized by us at the time. Neither at sea nor in Scapa Flow was the fleet safe from this menace, and even in the Clyde it might have been attacked by a well-trained force flying low across the neck of Scotland, despite the fighter defences. But no such force existed, and here is Hitler's account of the matter in conversation with Doenitz in July, 1943.

> "The Fuehrer describes the demonstrations held at the Torpedo Experimental Establishment in 1938, when the navy and air force, probably the only time they were ever in full agreement, tried to convince him that it would not be advisable to develop an aerial torpedo force.
>
> "These cleverly executed demonstrations made him abandon his plan to build up a strong aerial torpedo force which could have been used as a surprise measure at the outbreak of war. He would have gone ahead with those plans if the utter uselessness of this undertaking had not been proven to him so expertly at that time by means of these wretched demonstrations."

This may have been wisdom after the event—and after Pearl Harbour. But it was a real *cri de cœur*.

With the advent of Doenitz these minutes take on a very different tone. It is no longer: "the Commander-in-Chief, Navy, rarely had an opportunity to comment"; but: "the Fuehrer agrees," "the Fuehrer considers this a good idea," "the Fuehrer completely agrees with the Commander-in-Chief, Navy," "the Fuehrer repeatedly and emphatically expresses his agreement on this point." Doenitz was throughout high in Hitler's favour and personally congenial to him. Whether the Fuehrer's agreement to the many proposals made by Doenitz had the desired result is perhaps more doubtful. They were in the main for more manpower and material for the submarine campaign, and for more help from the air force. But it is unlikely that anyone else could have got more for the navy than Doenitz did, and if one can judge by his own minutes he seems to have put forward his views with tact and, when

Hitler occasionally opposed him, with firmness and insistence until the final decision was made. His return for Hitler's esteem and for the help that was nearly always promised was something akin to worship. A note which he appends to the minutes of one conference is of almost religious fervour :

> " The enormous strength which the Fuehrer radiates, his unwavering confidence and his far-sighted appraisal of the Italian situation have made it very clear in these days that we are all very insignificant in comparison with the Fuehrer, and that our knowledge and the picture we get from our limited vantage are fragmentary. Anyone who believes he can do better than the Fuehrer is silly."

And this was despite the already ominous results of Hitler's insistence on attacking Russia, and despite the fact that only three months previously : " the Fuehrer does not agree with the Duce that the most likely invasion point is Sicily. Furthermore, he believes that the discovered Anglo-Saxon order confirms the assumption that the planned attacks will be developed mainly against Sardinia and the Peloponnesus "—a view which Hitler seems to have maintained against all his advisers, to some detriment of the defence when the blow fell. One of his main views on the Italian situation, too, that Fascism could be effectively resuscitated by the release and reinstatement of Mussolini, was soon to be falsified.

It was not long after Doenitz had taken over that he had to discuss the ill success of the submarine campaign. On 11th April he reports that 19 submarines were lost in February, 15 in March, and 16 so far in April, and he tells Hitler : " These losses are high. Submarine warfare is difficult." But it is on 31st May that defeat is seen to be virtually inevitable, though never to be fully admitted even among themselves.

> " Our losses have increased during the last month from 14 submarines, or 13 per cent. of the submarines at sea, to 36 or even 37, or approximately 30 per cent. of all submarines at sea. These losses are too high. . . .
>
> " It is impossible to foretell to what extent submarine warfare will again become effective. The enemy's anti-submarine defence on water and from the air will be improved. That entails many uncertainties and unknown factors. In 1940 a submarine was able to sink on an average 1,000 tons per day at sea ; towards the end of 1942, approximately 200 tons. This shows clearly the growing effectiveness of anti-submarine defence, and the diminishing effectiveness of submarines. Nevertheless, I am convinced that submarine warfare must be carried on, even if great successes are no longer possible. The forces tied up through submarine warfare were considerable even during the World War.
>
> " The Fuehrer interrupts at this point with the following remark : ' There can be no talk of a let-up in submarine warfare. The Atlantic is my first line of defence in the West, and even if I have to fight a defensive battle there, that is better than waiting to defend myself on the coast of Europe. The enemy forces tied up by our submarine warfare are enormous, even though the actual losses inflicted by us are no longer great. I cannot afford to release these forces by discontinuing submarine warfare.
>
> " The Commander-in-Chief, Navy, continues : ' I therefore believe we must continue our present effort to increase submarine production.' "

It was on this basis that the campaign was continued. Though there could be no real victory, everything possible must be done to increase the weight of attack and

[1] This appears to be a misprint for 6. See figures given in " U-boat Casualties during the War." Cmd. 6843 (June, 1946).

eliminate the present causes of ill success ; and there must be a constant search for new weapons and new methods. This would certainly prevent the Allies from turning their anti-submarine forces to other employment, and at times the German command might even enhearten themselves with the belief that success was just round the corner. And so it continued to the end. Irrevocable failure was never admitted, though Doenitz knew in his heart that there was virtually no hope. From time to time some temporary success, such as came with the first use of the acoustic torpedo, made the old hopes flare up once more. On 24th September, for example : " the Fuehrer pointed with unprecedented emphasis to the importance of submarine warfare against shipping which is the only bright spot in an otherwise dark situation. Submarine warfare must therefore be stepped up by all available means." But this optimism had soon again to be quenched.

To their present difficulties there were two main aspects. One was the uncanny way in which Allied aircraft and surface vessels found surfaced submarines and, in the case of aircraft, often attacked before the submarine was aware of danger. The other was the inadequacy of the help given by the *Luftwaffe*.

Their difficulties in the first respect were partly of their own manufacture. They knew, of course, about airborne radar ; and to counter this a search-receiver had been fitted in submarines which effectively picked up the transmissions of the sets first fitted in Allied aircraft, and so gave the submarine warning of the enemy's approach. But when the original sets were superseded by a more efficient set on a different wave-length, the Germans found that their search-receivers were no longer warning them. In their attempts to find the reason for again being grievously surprised, they tumbled on the fact that their search-receivers were guilty of a certain amount of radiation which might be picked up by aircraft without the latter having to transmit—though in fact this seems neither to have been used by or even known to the Allies. It was to this that they attributed their troubles, and the use of these search-receivers was banned. When, later, they discovered what wave-lengths we were working on, they continued to be obsessed by this idea of search-receiver radiation. No receiver that would not pass the most stringent tests in this respect was allowed to be used, and as the technical difficulties of this were found to be great a satisfactory instrument was not produced until it was too late. In the meanwhile submarines had to endure surprise attacks as best they might.

And so it is that we find recorded in these minutes an almost despairing search for a solution of this problem. On 31st May Doenitz reports : " The determining factor is a new location device evidently used also by surface vessels, by means of which planes are now in a position to locate submarines." An efficient radar interception set is required which will show the frequency used. " We do not have such a set. We don't even know on what wave-length the enemy locates us. . . . I have ordered that our submarines shall operate at night only on one electric motor. Elimination of the noise of the Diesel engines will facilitate detection by sound. This seems the only means of warning submarines of an air attack." What a counsel of despair. Meanwhile there were the radar decoy buoys, " the so-called Aphrodite," and a hot search for some covering material that would absorb radar transmissions instead of reflecting them. " Professor Krauch of I.G.Farben is convinced he will soon find some material "—but later on no progress could be reported.

On 19th August Doenitz had to report that radiations from the Meto (the radar search-receiver) " may have been responsible for grievous losses. These radiations may explain all the uncanny and unsolved mysteries of the past. . . . The Fuehrer listens with the utmost interest to this explanation. He believes that

the theory just advanced does account for many baffling facts, such as the ability of the enemy frequently to determine the exact number of submarines in a patrol. With this discovery the Fuehrer believes a great step forward has been made." On 10th September Doenitz can report: "Fewer submarines have been lost since the Hagenuk device (Meto's successor) was introduced and the Meto switched off." But in the event this relief proved only temporary, and in fact the Hagenuk, too, was soon under suspicion for radiation and was withdrawn.

The problem of getting adequate help from the air force had in it more of the human element. Better long range reconnaissance was needed so that more convoys could be located, and at the same time more and better long-range fighters were wanted to combat the scourge of Allied aircraft on the submarines' lines of passage through the Bay of Biscay. This help the navy had long striven for, but the air force, headed by Goering, seems to have opposed a steady resistance to naval requests and to have virtually refused to pay any heed to naval advice in matters of sea warfare. It was indeed pathetic that the Commander-in-Chief of a Navy that had already been four years at war should have to plead: "The naval fliers must learn navigation at sea, celestial navigation, drift computation, how to keep contact with a convoy, . . . In short they must receive their training in the Baltic Sea together with the submarine personnel so that they will speak the same language and can subsequently fight together. A situation must not arise where co-operation in the Atlantic breaks down because certain mistakes are made which actually have nothing to do with the fundamentally sound principle of co-operation."

Doenitz was able to obtain full agreement from Hitler on this point and on the whole subject of air co-operation. But it does not seem that much was achieved despite the fact that at the next conference Hitler volunteered the statement that "he had recently personally intervened in the question of using aircraft for reconnaissance at sea and had interviewed the appropriate authorities of the air force." Five months later, on 19th December, Doenitz had to point out that: "Aside from the shortage of aircraft, insufficient training in navigation and communications has hampered the effective functioning of our aerial reconnaissance during the past few weeks and has shown the need for a co-ordinated training programme." This seems to have called forth an angry retort from Goering, for a paragraph in the minutes which was afterwards deleted says: "The Reichsmarschall, who was present at the conference, insisted that the air force does not bear sole responsibility for the failures so far. Of course the Commander-in-Chief, Navy, never made any such assertion."

These are Doenitz's minutes and as such are an *ex-parte* statement. None the less one is left with the impression of a man struggling creditably against great difficulties.

It is not to be supposed, of course, that success in these two points—an efficient radar search-receiver and better air co-operation, would have turned the tide of battle. Our victory was based on the sure foundation of effective convoy defence by sea and air forces in all areas where the flow of shipping was dense enough to tempt concentrated submarine attack. An efficient search-receiver would have meant that more submarines would have escaped destruction. But they would have been kept down by aircraft and made almost as immobile as they were later when forced to the expedient of the *schnorkel*. And better German air reconnaissance might have brought about more convoy battles; but we should have won those battles none the less. Our task would have been made more arduous and more costly, but the result would have been unaltered.

Much the same can be said of the hopes of new weapons. On 8th July there was an enthusiastic discussion about the design of the "electro" submarine. The principles of this are not fully explained, but it seems to have been a submarine with a submerged speed of 19 knots and considerable submerged endurance, obtained apparently by something revolutionary in battery design.[1] It was pleasant to be able to reflect: "This will make the present anti-submarine defence of the enemy entirely ineffectual because the construction of escort vessels is based on a low speed of submarines underwater." No doubt this submarine would have caused us considerable trouble had it materialized. But the tactical problems of using a high submerged speed for attacking a convoy have many difficulties, some of them probably insurmountable, and our defensive measures would, without doubt, have adapted themselves. Doenitz might have comforted himself by thinking, or pretending to think, that success was just round the corner; but round the corner it would have remained.

Of the German navy's failure in its defensive role, the protection of coastwise and short-sea routes, there are many indications in these minutes but not much direct discussion. The collapse in Tunis was attributed to the admitted inability of the Axis to keep the seaborne supply lines open; and abuse of the Italians, no doubt merited, for failure to render effective help was only a partial solace. And when, in the next phase, it came to maintaining the supply lines to threatened Sicily and Sardinia, the situation was as bad or worse. The operations of British submarines and Allied aircraft in the Tyrrhenian Sea and the tremendous pounding given to the Italian, Sicilian and Sardinian ports and the railways serving them by the Allied air forces put a virtual stop to all regular transport. Doenitz was driven to the conclusion that, as defence was impossible, all energies must be devoted to a system of blockade running between Italy and Sicily. He recommended using small craft, warships and even submarines to carry the supplies and discharge them at out-of-the-way spots. The wheel had certainly turned full circle since the Cretan campaign.

The difficulties in northern Europe, the extent to which the coasting trade in the North Sea and Baltic was endangered by the attacks of Coastal Command aircraft and the minelaying of Coastal and Bomber Commands are best shown by Hitler's strong opposition to using the new pressure ("oyster") mine lest we should copy it and retaliate in kind. Doenitz was keen to put it to extensive use as an offset to the failures of the submarine campaign; and, from our subsequent difficulties with this mine during the campaign of North-West Europe, it is reasonable to suppose that its use on a large scale in 1943 (had that been within German resources) would have caused us severe trouble. But Hitler would give only a very grudging consent, and perhaps because of his attitude nothing serious was done. On 8th July: "the Fuehrer expresses repeatedly his great misgivings as to the use of these mines by the air force because he is afraid that the mines might be dropped on land," and on 17th July:

> "The Fuehrer repeatedly asserts that he is very much worried that the enemy might in turn use these new-type mines if he finds them. This could easily be the case if the air force makes a mistake in dropping them. He is willing to let the navy lay the new mines at any time but you can never tell where the air force will drop them.

[1] It was not the submarine with Walther turbines, experimental models of which were already nearing completion. This also had a very high submerged speed but depended for it on a special fuel which limited its endurance at this high speed to a few *hours* only during a whole cruise.

" The Commander-in-Chief, Navy, points out that experienced units of the air force were very successful in laying mines and that with proper training this could be done even now. For minelaying the navy must depend on motor torpedo-boats which can lay 500 mines per month at the most, and that is not enough.

" The Fuehrer replies to this : ' All right, I agree, but I call attention to what can happen if the British drop these mines in the Baltic Sea. Then we are through.' "

Nothing could illustrate more clearly the great strain being imposed by our warfare against German seaborne traffic.

At the last conference in 1943 (on 20th December) Doenitz informed Hitler of the orders given to the " Scharnhorst " to attack the next Russian convoy. For Hitler's comments on the disastrous result of that operation we must await the 1944 volume. It will be interesting to see whether he consoled himself by saying : " I told you so "—for in view of what is recorded in the early part of the present volume it would certainly have been within his rights. That episode spelt the end of the German big-ship navy. The submarines continued to fight with courage and determination, but they too had been defeated. The shipping sunk in the whole of the next year only just exceeded what was destroyed in a single month in the Summer of 1942.

MANPOWER AND THE SERVICES

By Sir Godfrey Ince, K.C.B., K.B.E., B.Sc.

On Wednesday, 5th March, 1947, at 3 p.m.

General Sir Richard N. O'Connor, K.C.B., D.S.O., M.C., A.D.C.,
in the Chair

The Chairman: I have very much pleasure in introducing the Lecturer, Sir Godfrey Ince. As you know, he is going to lecture on manpower, and I can assure you that there is nobody more competent or more fitted by his experience to do so.

During the vital years of 1942-1944, he was Director-General of Manpower, and thereafter became Permanent Under-Secretary to the Ministry of Labour and National Service, which post he still holds.

LECTURE

IT is a great privilege to me to have the honour of addressing such a distinguished audience of the Royal United Service Institution on the subject of "Manpower and the Services." It is a subject with which I lived right throughout the War, particularly from 1941 to the end of the War. I am, perhaps, not now quite so closely associated with it as in those days, but it is still a very live matter—a matter of constant consideration in connection with our many manpower problems.

To-day, I want to look back upon the past and give you some indication of what was achieved in the mobilization of our man and woman power for the Forces and the principles that were adopted, and then to come to the present and endeavour to look a little way into the future.

Mobilization

The fundamental aim of the Government's manpower policy was to mobilize the nation's resources in such a way and at such a speed that our naval, military and air forces and our war production reached their highest point at the time when maximum impact against the enemy was required.

I have not time to-day to tell you in any detail of the development of the plan for mobilizing the nation, of the various controls that were used and the methods adopted, but I want to give you a brief indication of the general system by which the allocation of manpower for the Services and for industry was determined, and of the way in which the Services were supplied with the men and women they needed in accordance with the allocations laid down by the Cabinet.

The settling of the broad allocations to the Services and industry involved a continuous survey of the Country's manpower. Each survey gave an analysis of the Country's total manpower showing the numbers of men and women employed in each industry and in each of the three Services and, within manufacturing industry, the numbers engaged in manufacturing equipment and supplies for the Forces and in production for export and for the civilian home market. This information, so far as industry was concerned, was derived in the main from returns rendered each month by over fifty thousand employers. Forecasts were made of the net changes in the total manpower likely to be available during the ensuing period under review—usually the following year—and information was collected from the Service, Supply and other Departments as to the numbers needed to meet requirements. It was usually found that the expected net increase in total manpower was far less than the expansion needed by the Service and Supply Departments, and consequently this expansion could only be provided by drastic reductions in

the manpower engaged in work for the home civilian and export markets. The material then assembled made up a Manpower Budget on the basis of which allocations were approved by the Cabinet for the Services, Civil Defence, the Supply Departments and the rest of industry.

This settled the first problem of fixing the overall balance between the Services and industry. The second problem was to supply the Services with the right men and women and to retain the right men and women in industry. The basic instrument for solving this problem was registration of men under the National Service Act and of women under the Registration for Employment Order.

The National Service Acts

Shortly before the War, in May, 1939, the Military Training Act came into operation, providing for the registration, medical examination and calling up for training of men aged 20. Only one registration of an age class under that Act took place, because of the subsequent outbreak of war, but the establishment of the necessary machinery for the purpose of carrying out registration, medical examination and calling up and the experience of dealing with one age group proved invaluable to us when war came. For you must remember that it was the first time that a civilian Department—the Ministry of Labour and National Service, had been given the responsibility of being the " recruiting-sergeant " for the whole of the Forces.

On 3rd September, 1939—the day on which this Country declared war on Germany, the National Service (Armed Forces) Act was passed in all its stages through both Houses of Parliament and became immediately operative. This Act, which was the first war-time measure affecting manpower, made all male British subjects in Great Britain aged 18 to 40, inclusive, liable for military service. The National Service (No. 2) Act, passed in December, 1941, raised the call-up age to 50, while the National Service Act of 1942, reduced to 17 years 8 months the age at which men might be called upon to register, although leaving the liability to be called up for service at the age of 18.

The No. 2 Act of 1941 was a historic Act in that it made women liable to be called up for service in the Women's Auxiliary Services.

Registration

These, then, were the Acts from which we derived our powers and under which we operated. The first step in the process of calling-up was registration. This was done by requiring successive age groups to register at the local offices of the Ministry of Labour and National Service where they had to give particulars of occupations and qualifications. At registration, men were allowed to express a preference for the Navy, Army or the Royal Air Force if they wished.

The order of registration of the various age classes was youngest first, and the dates of registration of particular age classes were arranged so as to provide a sufficient and continuous flow of men for the Services. So far as men were concerned, we started with those aged 20 and went on successively right up to 35, when we went back a stage and registered the 19's. Subsequently, we went on up to age 41, and after that we registered those aged 18 and then successively registered the boys as they became 18.

Women were registered in the same way as men—the youngest age classes first—but only women aged 19 to 25 were called up compulsorily. There was one special feature in the calling up of women, however, which I believe was responsible

for making it go so smoothly. When women registered we allowed them to express a preference for either the Forces, Civil Defence or industry. After a short time, the Civil Defence option was withdrawn and they had the choice between the Forces and industry. We honoured the preferences they expressed. All the women who opted for the Forces were called up to the Women's Services and all those who opted for industry were directed into industry.

We found that, on the registration of each age class, about one-third of the women opted for the Forces, one-third for industry and one-third expressed no preference at all. That, as it proved, was a great advantage as it gave the scheme a certain flexibility. In the early stages, when we wanted women in the Forces, we called up to the Women's Services the one-third which had not expressed any option; when all the pressure was on industry and we wanted additional women in industry, we called up the one-third to industry.

Balance between Forces and Industry

I have already described the procedure by which the broad allocations of manpower to the Services and industry were settled by the Cabinet. These allocations had to be worked out in detail. The Services required large numbers of men skilled in particular occupations as well as men for general service. On the other hand, the production of munitions, using the term in its broadest sense, as well as the general life of the community could only be carried on if sufficient numbers of skilled men were left in industry. On these men depended the practicability of employing in industry the millions of semi-skilled and unskilled men and women who were being mobilized from the non-industrial section of the community. The instrument we used for the purpose of distinguishing the man who could be recruited for the Forces from the man who must be retained in industry was the Schedule of Reserved Occupations. This Schedule was compiled before the War and great care was taken in its preparation. For men, all occupations were in the Schedule and against each was an age of reservation.

There were different ages for different occupations. Men below the age of reservation were called up; men at and above the age of reservation were reserved. In highly skilled occupations where there was likely to be a shortage of supply for industry, the age of reservation was put at 18, in which case no one could be called up, or at 21, in which case only those aged 18, 19 and 20, could be called up. In other occupations the age of reservation was either 25, 30 or 35. Changing requirements and changing circumstances in industry and the Forces were met from time to time by altering the age of reservation. Flexibility was also obtained by deferring the call-up of individual key workers below the age of reservation.

In the earlier stages of the War this system—which became known as the system of block reservation by occupation—was very effective, but in 1941, it became clear that, owing to the increasing scarcity of manpower some finer instrument was required. Accordingly, at the beginning of 1942, we changed over from the system of block reservation by occupation to a system of individual deferment. That was done by raising the age of reservation for each occupation by one year in monthly steps. For example, let us assume the age of reservation for a railway porter was 30. On 1st January, 1942, the age of reservation became 31, on 1st February it became 32, on 1st March it became 33 and so on. The result was that each month we had a whole block of people who became de-reserved. It was then necessary for each case to be looked at and a decision as to calling up taken on the merits of that case. In other words, it was a system of individual deferment.

In order to deal with all these thousands of cases, we set up 44 Manpower Boards throughout the Country, consisting of five persons—a chairman, a deferment officer, a labour supply officer, a military recruiting officer and a womanpower officer. All the decisions were collective decisions of the Board. I think it can be said that these Boards were a great success and carried out an enormous task smoothly and entirely satisfactorily. From the beginning of January, 1942, to the end of the War they considered and dealt with 4,800,000 cases of individual deferment or renewal of deferment. That gives you some idea of the volume of work involved in this system of individual deferment.

For women, there was no Schedule of Reserved Occupations, but women engaged in certain vital war work or service were regarded as reserved from calling-up. Apart from this, women were dealt with on an individual basis for deferment.

There was a special refinement of the reservation system to deal with skilled men required in the Forces as Service tradesmen. Special steps were taken in this matter. Tradesmen who were not in short supply in industry were called up for service in their Service trade and, if there was a surplus of them available for calling-up, the surplus was called up for general service. But tradesmen who were in short supply in industry were called up to the Forces only for service in their corresponding Service trade.

Then there were the technicians. These were dealt with by an inter-departmental committee called the Technical Personnel Committee, under the Chairmanship of Lord Hankey. This committee had in the main two tasks. All technicians were reserved; and, therefore, to obtain men for technical commissions in the Forces, industry had to be combed. The second task was to increase the supply of technicians. This was done by arranging for short University courses of one or two years for science and engineering students and by arranging for the provision of State bursaries and engineering cadetships which enabled those to whom they were awarded to go to technical institutes. By these means, substantial numbers of young men were trained as technicians to be allocated to the Forces and to industry as necessary.

This balancing of the requirements of the Forces and the needs of industry by means of the Manpower Budget and the allocation system and the instruments of reservation and deferment was the kernel of the manpower problem during the War and our whole war effort depended upon us getting the correct balance. It is of interest to see what that balance was in figures at the end of the War in mid-1945, and how it differed with the various age groups.

For the age groups 18 to 20, 60 per cent. were in the Forces and 40 per cent. in industry. For the age groups 21 to 24, 66 per cent. were in the Forces and 34 per cent. in industry. For the age groups 25 to 29, 63 per cent. were in the Forces and 37 per cent. in industry. You may be surprised that a greater percentage of the youngest age groups, 18 to 20, should have been retained in industry than in the age groups 21 to 29. The reason for this is of particular interest at the present time because it is due to the retention of young men in the coal-mines and to the deferment of military service in the case of apprentices.

As you would expect, as soon as we pass the age of 30 the percentage retained in industry rises rapidly. In the 30 to 34 age groups, 48 per cent. were in the Forces and 52 per cent. in industry, and in the 35 to 39 age groups, 33 per cent. were in the Forces and 67 per cent. in industry. Taking all the age groups from 18 to 39 inclusive, 53 per cent. were in the Forces and 47 per cent. were retained in industry.

Medical Examination

Having sorted out those who were reserved and were to remain in industry and those who were not reserved, the next step was to call up for medical examination those not reserved. This was done by 300 medical Boards, consisting initially of five and later of four doctors. These Boards graded the men into five grades: grade 1, grade 2, grade 2A, grade 3 and grade 4. Those in grades 3 and 4 were not called up, but directed to war work in industry.

Now I should like to give you some of the facts disclosed by the medical examinations. In interpreting these facts, it must be remembered that the medical standards adopted were designed to assess a man's fitness as a fighting unit; that men obviously crippled, the blind and the mentally-deficient were exempt from registration and therefore medical examination; and that as about 45 per cent. of the total number of medical examinations of men related to those under 21 years of age and only 11 per cent. to those aged 36 and over, the sample of the population examined is heavily biased in favour of the medically fit classes.

The figures showed that of the men under 21, only 9 per cent. were in medical grades 3 and 4, that is, only 9 per cent. were unfit for military service. Of the 21 to 25 age group, 15 per cent. were unfit for military service; of the 26 to 35 age group, 21 per cent., and of those 36 and over, 35 per cent. were unfit. Taking all age groups, 16 per cent. were unfit for military service.

On the women's side, one additional factor must be taken into account, namely that the great majority of the women examined were volunteers and, therefore, *prima facie* fit. Also, nearly 90 per cent. of the women examined were under 26 years of age. Of the under 21's, 7 per cent. were unfit for military service; of those in the age groups 21 to 25, 12 per cent. were unfit; in the age groups 26 to 30, 12 per cent. were unfit, and of those 31 and over, 17 per cent. were unfit. Taking all age groups, 10 per cent. were unfit for military service.

Men in medical grades 1, 2 and 2A were issued with enlistment notices and called up to the Forces. I said earlier that, on registration, men were given the chance of expressing a preference for the Navy, Army or Air Force. So far as possible, when calling men up, we honoured their preferences and called them up to the Service of their choice, but it was not always possible to do so, as it obviously depended on the respective requirements of the three Services at the time.

Results

Now may I come to the results of all this. At mid-1939, the strength of the Forces was 480,000 men. In the first nine months of the War, the intake of men to the Forces, volunteers and national service men, was 1,650,000. In the following year, from mid-1940 to mid-1941, the intake amounted to 1,300,000 men. Almost three millions in the first twenty-one months was, I suggest, a great achievement. Naturally, the rate of intake declined in subsequent years, but it is significant to note that in the last year of the War—a year when, to use General Eisenhower's expression, we were a "labour-exhausted Britain," meaning that we had no reserves of manpower left upon which to draw—we were able to provide an intake sufficient to yield a net increase in the strength of the Forces.

From the beginning of the War till the defeat of Germany, the intake into the Services totalled 5,196,000 men, of which 2,248,000 were volunteers and 2,948,000 were men called up under the National Service Acts. During the same period,

there was an intake of nearly 650,000 women into the Women's Auxiliary Services and the Navy, Army and Air Force Nursing Services.

Taking manpower in the Services and industry as a whole, we reached the peak of our mobilization in September, 1943, since when our manpower has been running down, and is still running down to-day. But although our manpower was running down from September, 1943, we increased the intensity of our mobilization for operational purposes right up to and beyond D-day in June, 1944. By that time, the strength of our Forces amounted to 5 millions. In the year following the landing on the beaches of Normandy, in spite of the running down of our manpower and in spite of casualties, we succeeded not only in maintaining the Forces at this strength but actually increasing it to 5,090,000, made up of about 4,650,000 men and 440,000 women.

Demobilization

Since the end of the War, we have been engaged in demobilizing the Forces, and up to date over 4¼ million men and women have been released since mid-1945. At the end of 1946, the strength of the Forces was 1,427,000—approximately 1,350,000 men and 75,000 women.

Now before going on to refer briefly to the future, I should, perhaps, say something at this stage about the production of munitions and equipment for the Forces and also give some indication of the effects of our intense mobilization for war on our civilian economy, together with the extent to which we have succeeded in changing over from a war to a peace economy.

Equipment and Supplies for the Forces

May I first of all take the numbers engaged on the production of equipment and supplies for the Forces. Just before the War in 1939, we had about 1,270,000 men and women engaged on this production. There had already been a substantial increase in the previous year. The figure went up very rapidly as soon as the mobilization of manpower got properly under way, and it reached the high peak of 5,350,000 in September, 1943. Thereafter, our munitions labour force began to run down. In fact, it was made to run down by the calling up for the Forces of considerable numbers of young men who up to that time had been retained on munitions production. You may wonder why, at that stage in the War, nine months before D-day, it was possible to allow the labour force engaged on munitions to be reduced. The reason was this. At the time of Dunkirk, we lost practically the whole of the capital equipment of the Army. Therefore, in addition to building up our Navy and our Air Force, we had to start in 1940 practically from scratch so far as the Army was concerned. This was a great task. By 1943, we had succeeded in supplying the Army with its capital equipment, and thereafter it was largely a question of maintaining that capital equipment and of producing new weapons. For this we did not need so many workers and we were, therefore, able to run down our munitions labour force to a figure of 3,900,000 at the end of the war with Germany.

Since then our munitions industries have been changing over to civilian production, and by the end of 1946 we had only 459,000 men and women engaged on the production of equipment and supplies for the Forces, a reduction in eighteen months of nearly 3½ millions.

It is of interest to note that just before the War, we had 1¾ million persons either in the Forces or producing equipment and supplies for them, 10½ millions at the peak

of our mobilization, and 1,886,000 at the end of 1946—only just over 100,000 more than at the beginning of the War.

Effect on Civilian Economy

As measured in manpower, the effects of our war mobilization on our civilian economy can best be seen by looking at the results in the export trade, in the manufacture of goods for the home market and in the provision of services for the civilian population. Before the War, we had about 1,150,000 persons engaged on exports, including those employed on producing coal for export. By 1943, this had been reduced to 275,000—a reduction of 76 per cent. So far as manufactures for the home market are concerned, the manpower was reduced by half. Again, in the distributive trades one million men out of a total of 2,887,000 men and women were either called up to the Forces or transferred to other industries, and the net drop in employment—men and women together—was nearly one-third. The same proportion was taken from other services such as catering and entertainment. These are dislocations of great magnitude.

It is true that by the end of 1946, in a period of eighteen months, there was a great change back to civilian production, both for export and for the home market. The numbers engaged on exports at the end of 1946 were 1,476,000—an increase of 48 per cent. over the mid-1939 figure, while the numbers engaged on manufactures for the home market had also passed the pre-war figure by over 10 per cent. This sounds very satisfactory, but it is not quite so satisfactory as it sounds—and for two reasons. First of all, because the increase in the numbers engaged on exports is not sufficient to produce all the exports needed to balance our essential imports. As you know, the Government have stated that, if we are to balance our overseas payments, the volume of our exports must be increased to 75 per cent. above the pre-war level. Nothing is more vital to the future economic position of this country than the balancing of our foreign trade. To secure a 75 per cent. increase in our exports over pre-war we need something like two millions employed on making goods for export. We have, therefore, still to increase our labour force engaged on export by about another half-million.

The other reason why the position is not so satisfactory as it sounds is that these overall figures hide the fact that the distribution of manpower among the industries covered by these two broad groups—export and home market manufactures—is still distorted. In the case of exports, there are very few miners engaged to-day on the production of coal for export, whereas, in 1939, there were 160,000. The effect of this is that the manufacturing industries of the country are being called upon to provide all our exports, and this is having to be done at the expense of our home markets. In the production of goods both for export and the home market, the labour force in the metal industries is considerably swollen compared with pre-war—as you would naturally expect having regard to the tremendous expansion of these industries during the War. But this expansion is at the expense of the other manufacturing industries of the countries, such as the textile, clothing, boot and shoe, leather and pottery industries, which are some hundreds of thousands of workers short. Unfortunately, the distributive trades and the consumer services have recovered only a moderate proportion of the manpower which they lost during the War and are still about three-quarters of a million below their mid-1939 level.

You will see, therefore, that, quite apart from the present situation in which we find ourselves, which arises from a shortage of fuel and power, we have by no means fully recovered from the distortion of our economy caused by the high degree of our war mobilization.

THE FUTURE

And now I want to return to the Forces and look forward into the future. The White Paper on the Call-up to the Forces in 1947 and 1948 (Cmd. 6831), issued in May, 1946, stated that from 1st January, 1947, call-up for the Forces would be confined to men liable under the National Service Acts who were born in or after 1929 (that is, the 18-year-olds) and to those born in 1927 and 1928 in process of being called up in December, 1946. It also stated that men called up during 1947 would serve for a period of two years and, if no unforeseen circumstances arose, the period of service of men called up in 1948 would be progressively reduced from two years to eighteen months.

As regards releases, the White Paper says that the national service men already serving in the Forces at the end of 1946 would be released before the end of 1948 under the age and length of service scheme and that it would be the aim of the Government to release during this year all men called up before 1st January, 1944. Having regard to these undertakings, to our military commitments throughout the World and to the necessity of restoring a balanced peace economy at the earliest moment, the strength of the Forces will be reduced, as stated in the Economic Survey for 1947, issued recently, to 1,170,000 by the end of this year.

During the War, the build-up of the Forces was, of course, governed by the rate of intake. At the present time, the strength is governed mainly by the rate of demobilization—a matter within the control of the Government. By the time we get to the end of 1948, the position will be changing. Clearly, in determining the size of the Forces the Government will have to have regard to our military commitments and to the requirements of industry, but it will not be so completely under the Government's control as heretofore for the reason that, as from 1st January this year, young men are being called up for a fixed period of service. The numbers called up under the National Service Acts will be limited. Only the 18-year-olds will be called up, but call-up will be deferred on grounds of industrial need in the case of men employed in coalmining, agriculture, building and the production of certain building materials. The Government also desire to encourage efficient schemes of professional and industrial training, and apprentices will be eligible for deferment for the period necessary to complete their training, provided that the District Manpower Boards are satisfied about the conditions of apprenticeship. Articled clerks, learners and others in a similar position will be treated on the same basis as apprentices. As the limited number due to be called up under these conditions will serve for a fixed period, the total number of such men serving at a particular date cannot be great and the strength of the Forces will, therefore, depend largely on the number of volunteers.

While it is not for me to attempt to speculate on what our future commitments are likely to be—it would be most improper for me to do so—it is well known how many national service men will be available for calling up each year. These will provide a basic element, the rest being Regulars and short term volunteers. As I have already said, men called up during 1947 will serve for a period of two years and the national service men already serving in the Forces at the end of 1946 will be released before the end of 1948. This means that at the beginning of 1949, the number of national service men in the Forces will be about 350,000.

From 1st January, 1949, it is the Government's intention, as announced in the House of Commons by the Prime Minister, to call up young men as they reach the age of 18 for a period of eighteen months' service. Accordingly, by the middle of

1950 and thereafter, the number of national service men in the Forces will be about 300,000. This is on the basis of eighteen months' compulsory service. If that period should be altered—if, for example, it should be reduced to twelve months' service—the number of national service men in the Forces would be about 200,000 instead of 300,000.[1]

The additional needs of the Forces will have to be made up by Regulars and short term volunteers, and the figures I have given you of the number of national service men who will be available give you some indication of the extent to which the Forces will have to rely on volunteers. It would not be right for me to suggest how many volunteers are likely to be available or to be needed, but I think it is relevant for me to draw your attention to a passage in the recent Defence White Paper referring to the decision of the Government to introduce this Session a Bill for continuing the system of compulsory national service and the statement in the Debate on the Address of the Prime Minister that the governing consideration which had influenced the Government was the likelihood that the rapid developments in modern warfare would rob this country of that breathing space—measured in years rather than in months—by virtue of which alone in the past two great wars we have been enabled to build up our warlike strength and thus overcome our enemies. As the Prime Minister said :—

> " The logic of that is that while we keep our front line Forces as low as we can consonant with efficiency and the jobs they have to do, we must have trained reserves who can take their part right away without waiting for six months' training."

The Defence White Paper goes on to say that the numbers of reserves required can only be provided by a system of compulsory national service consisting of a minimum period with the Colours and several years of reserve service. It is the intention that this system of national service shall become operative at the beginning of 1949. We shall thus begin to build up reserve forces of trained men in 1951 and the following years. At the present time, of course, we have large numbers of trained men in the country and shall have for some years to come. These will dwindle rapidly as time goes on, but they will be reinforced, as I have said, by the national service reserves.

As I said earlier, our total manpower is still running down. The chief reason for this is the continued fall in the birthrate in the 1930's. To illustrate the effect of this, may I quote the figures of young men reaching the age of 18 in 1939, last year, and in 1950 :—

1939	...	...	...	417,000
1946	...	...	...	335,000
1950	...	...	...	295,000

The youth of this country is the most priceless asset we have and it, therefore, behoves us to see not only that it is not wasted but that it is properly trained so that, on attaining manhood, every boy is in a position to make a maximum contribution to the well-being of his Country. A great responsibility will rest on the Services, for they will have in their hands for a period of eighteen months[2] at the vital age of 18 the youth of the nation, and on the way in which they train and mould them during that period will largely depend the future of our Country.

[1] Since the date of this Lecture, the period of eighteen months' service has been reduced to twelve months.

[2] Now settled at twelve months.

DISCUSSION

COLONEL F. H. SMITH: The Lecturer has told us that the total number of people called up during the War was just over 5,160,000. That represents more than 10 per cent. of our population and, bearing in mind that in India we have been very fortunate to be able to keep 1 per cent. of the population in the field, it gives some indication of what mechanization can do.

I am not concerned so much about manpower as "man production power." The question of output must be stressed, because when you see what the average man did twenty years ago and compare it with the work done by some of the Weary Willies and Tired Tims of to-day, especially in the building trades, it drives one to the conclusion that the term "manpower" means nothing. If there are one thousand men called up and they are doing the work of one hundred men, what is meant by manpower?

I do appreciate that the responsibility for training and educating youth to work is an important matter. We had a most interesting reference to this question by General Paget, who stressed the point that in these days of nationalization, bureaucracy and the desire to have so much leisure, the joy of work is becoming a back unit. If we can induce youth by education and training to take an interest and joy in their work, we shall be doing a very great thing.

In training technicians for Army work, keen interest is now being taken in their previous work in life. I do think that the Army has got the correct objective in view in continuing the training in the future interests of youth, so that when their training in the Army is finished, they will be a greater asset to the Country's and the Empire's technical requirements.

THE LECTURER: I regard the training of the youth of this Country, wherever the responsibility may lie at any time—whether it be with the Forces or industry—as the most important factor of all. If we do not train our youth properly now and in the future, when it is becoming so scarce, then we just have no chance in this Country. I regard the proper training of youth as being more important than anything else which has to be done in the next few years.

LIEUT.-COLONEL J. G. C. WALDRON: In your carefully planned allocation of manpower to the Services and to industry, what limitations have you put upon the total manpower, male and female, to be employed in civil administration and the Civil Service?

THE LECTURER: We obtained our requirements for National Government and Local Government in the same way as the requirements for industry, and allocations were made in the same way as they were made for industry, Civil Defence and for the Services.

CAPTAIN A. N. D. KERR, R.E.M.E.: I understood the lecturer to say that there were another hundred thousand over and above those who were engaged at the beginning of the War on munitions, but in the six years which have elapsed since then there has been a considerable increase in the mechanization of equipment in factories, so that the output per worker should have greatly increased and we should be able to do with lesser quantity. We could do with a substantial proportion of the one hundred thousand in industry. Until there are nine men available for eight jobs and until there is the necessary incentive we shall not get the production which is so necessary for our exports.

Arising out of the manpower question, I should like to ask whether any consideration has been given to a scheme to enable the various small and medium size firms which manufactured munitions during the war, but which do not manufacture them now, to be organized so that they can go into production quickly if necessary without the dislocation which took place at the beginning of the War? At that time, over two years elapsed before the small firms were mobilized.

THE LECTURER: I could not have made myself clear with regard to the first point. In May, 1939, we had 1,270,000 men and women engaged in making equipment and supplies, commonly called "munitions," for the Forces. Those people were engaged not only on manufacturing guns and ammunition, but clothing, boots and so on. At

the end of 1946, there were 459,000 so engaged, which is very much below the pre-war level and not above it. The figure to-day stands at about 450,000, which is about 800,000 less than in 1939.

What I did say was that if you take the number of men and women in the Forces, plus the number of people engaged on making munitions and supplies for the Forces, you get a total of one and three-quarter millions before the War, whereas if you take the number of people in the Forces to-day, together with the number engaged in making munitions and supplies for them, the total is just over 100,000 more.

MAJOR C. H. B. PRIDHAM: During the 1914-18 War, coal miners were called out of the mines and put in the front line in France. In July, 1918, it was found to have been a mistake, so they were taken home and put back into the mines. I should like to know whether the Lecturer thinks a mistake was made in the late war by taking miners out of the mines and putting them in the Forces in view of what has happened since.

THE LECTURER: It is always easy to be wise after the event, but if you look back you will see that there were one or two things which one must bear in mind. First of all, quite a number of our Territorial regiments consisted very largely of miners. Before the War, miners were encouraged to join the Territorial Army, particularly regiments like the Durham Light Infantry, the Sherwood Foresters and the Northumberland Fusiliers. Therefore, at the outbreak of war, when we had not a large number of trained men, you would have devastated quite a number of the Territorial regiments if you had said no miner should be called up. Secondly, when France went out of the War, the bottom fell out of the coal industry to a great extent and we had a large number of coal miners unemployed—unemployed at a time when we wanted men for the Forces most desperately. The question was, therefore, should we call up unemployed miners or should we not? At that stage, it was not possible to look forward five or six years ahead to see what the position would be. At that time, we were fighting for our lives —fighting for the survival of this Country. That was the reason why, at that stage, coal miners were called up.

Later on we reached the stage when it became clear that we had not enough coal miners in the Country, and then the question arose whether they should be released from the Services. Again, there was a serious difficulty because it was found that large numbers of the miners that were in the Army were in the 8th Army, and that particular army at the time was fighting in North Africa. Therefore, the question arose: was it a practical proposition to withdraw miners from the 8th Army in the middle of its battles in North Africa?

No miner has been called up since 1941, but as to whether or not it was wrong to have called them up at the time of Dunkirk, whether it was wrong to have called them up at the outbreak of war, whether it was wrong to bring back miners from the 8th Army, I do not know. I think, however, that there are facts to be borne in mind when people say that we should not have called up any miners at all.

VICE-ADMIRAL C. V. USBORNE: I should be interested to know, with regard to the present time and the near future, whether any measures are being taken to direct labour into industries engaged on the manufacture of goods for export rather than into industries manufacturing goods for home consumption. Also, with regard to people engaged in industries manufacturing for home consumption, do we differentiate between necessary and luxury goods?

THE LECTURER: I am not quite sure whether or not when you use the word "direct" you mean compulsorily direct. It is the policy of the Government, and has been the policy of the Government ever since the end of the War, to relax labour controls; and while we have power to direct persons to do any job in this Country, that power is not used to-day except in very exceptional circumstances. It is not used except in respect of coal mining, agriculture and the building industry, and then it is only applied in special circumstances.

So far as the general labour supply is concerned, all labour controls are off; therefore, we do not compulsorily direct people into the places where they are most urgently

needed. In the absence of labour control, you cannot get the people you need into the places where they are most urgently required, although there are methods by which you can get people to go into certain industries. In that connection, we use our own machinery—the employment exchanges, to try to persuade the large number of people coming out of the Forces to go into the important jobs. We tell them what are the important jobs, but we do not compel them, and if somebody comes along and says he is not going into one of those jobs, there are no means of making him.

There are other methods of raw material controls and cutting price margins and so on to reduce the incentive in less important industries. In the undermanned industries, measures have been taken to improve the working conditions of those industries. The brickyards are an example, where conditions have been substantially improved with a view to inducing people to come into the brick-making industry.

COLONEL G. W. M. GROVER, Royal Marines: The problem of manpower has always seemed to me to lie in the difficulty of fitting it in exactly where you want it to go. In other words, it is a question of integration. For example, when a ship's plumber comes before me, as a naval recruiter, I cannot offer any inducement because the system is different, I think if we are to continue with conscription that we should endeavour to equate military and commercial industrial practices to the best advantage, remembering, of course, that recruiters are people of limited knowledge of all Service technical requirements.

Another point is that the Ministry have certain standards. Grade 1 is the best standard and 65 per cent. go into Grade 1. Grade 2, as far as I can recall, is perfectly all right but means that a man has some minor disablement of feet or vision. It is when we come to Grade 3 that things become a little bit tricky. We know for some time ahead the medical categories of those men we are going to get, but there is another problem which is a psychological one. All the Services adopt the psychological tests, but it seems to me that those psychological tests might be taken a stage further so as to give us and the man himself some idea of what he is going into when he is called up.

THE LECTURER: With regard to the first point, I would not say that there has been integration to the full extent that is possible. It must be remembered, however, that many problems of that kind, of giving the Services the right men, would be solved if we had plenty of men. During the War, it was a case of the Services wanting very large numbers of people, and we quite soon ran into the position of having a shortage of manpower with the result that many of the men who were supplied to the three Services were not of the type the Services wanted. They did not fit into many of the places into which the Services wanted them to fit, but so far as skilled men are concerned, I think we did go a very long way in the latter part of the War towards supplying the right type of tradesmen. It is true that was not done in the beginning of the War; in many cases, jobs which they did in industry were not comparable with the jobs they were required to do in the Services and they needed re-training, but in the latter stages of the War, we did get down to finer limits and were able to supply men who, I think, were a lot nearer to the kind needed by the Services.

In the present position, the problem is going to be rather different, because numbers are going to be comparatively small; but again, if the principle of calling up whole age classes is adopted, some of the men in that class must necessarily be misfits. The only alternative is for the Services to throw out the misfits and say: "We do not want these people in the Services," which means your other problems are going to be worse because the number of people you are going to have called up compulsorily is going to be less.

On the question as to whether or not it would be useful to have a psychological test before going into the Services rather than after, there is a difficulty in that if you are going to give a man an option as to whether he goes into the Army, Navy or Air Force and you have a psychological test, the answer may come out quite differently, and it might mean that the practice of giving the man the option would have to be thrown overboard.

A. R. FARQUHAR: Would the housing shortage have any bearing on the difficulty of getting people into the right export industries?

THE LECTURER: Yes; our labour to-day is practically immobile, and whilst, for example, we could undoubtedly get people to take jobs of vital importance to our export trade, they cannot do it because they cannot move. There are no houses available in the areas concerned and, in many cases, there are no lodgings available. It is a great problem to-day.

THE CHAIRMAN

I think we all agree that we have listened to an extremely able and instructive discourse. From the number of questions that have been asked and the length of the discussion, I think we can say that this has been a most interesting lecture from every point of view.

I would only sum up very briefly on one or two points which mainly affect the Services The first one, I think, is this. The Services are not grasping. We do fully realize that we are part of the national scheme and its success depends on the allocation being in accordance with the requirements.

From what the Lecturer has told us, nothing is more vital to the future economic position of this Country than the balancing of foreign trade and the fact that the labour market is still 500,000 short. We are fully conscious of that.

We do possess in the Services to-day complete machinery for the allocation of manpower. At the end of six weeks a report on each soldier is furnished and we believe that in practice we are getting the right man in the right place.

With regard to the A.T.S., it is well known what they achieved in the War, and I can say from the Army's point of view how much we welcome the Government's decision to allow them to become part of the Army of to-day and of the future.

Finally, I should like to say that we do accept the responsibility and fully realize that responsibility which rests upon us with regard to the training of the youth of this Country. We appreciate that we have to train them in the first place in the Army as soldiers, and we also appreciate that we have another duty, that is to train them and turn them into good citizens. We are fully conscious of that, and during their training, where it is possible—and I hope that it will be possible in most places—their education will be continued under the training of the Royal Army Educational Corps and, where possible, facilities granted to them for outside instruction.

I should like to conclude by saying what tremendous co-operation we have had from the Ministry of Labour and, in particular, from the Lecturer himself. We are very grateful to him for the great assistance he has always given us. I can assure you that he is an extremely busy man and that his work does not end at 5 p.m. He does a good deal more than one man's normal work.

I would, therefore, ask you to show your appreciation of his lecture in the usual way. (*Prolonged applause.*)

AIR CHIEF MARSHAL SIR JOHN SLESSOR: I rise on your behalf to propose a hearty vote of thanks to the Adjutant-General and, on behalf of the Royal Air Force, to endorse very strongly what he said about the Ministry of Labour. We are very grateful to him for coming along to-day. (*Applause.*)

ECONOMY OF MANPOWER IN THE SERVICES

By Brigadier F. A. S. Clarke, D.S.O., *p.s.c.*

THE question of the proper use of the Nation's manpower is very much to the fore just now and is one which vitally affects all three Services. The economic needs of the country and the competing demands for manpower were, according to Government spokesmen, the main reason for the reduction of the period of National Service from eighteen to twelve months. Whether this was really the case need not be discussed here. But the fact remains that a shortage exists and the reduction referred to will increase the difficulties of the Services in meeting their various commitments.

The object of this paper is to stimulate thought on the subject and to draw attention to possible means of making the best use of the limited manpower available to the Services in the near future. It is written mainly from the point of view of the Army, that being the Service with which the writer is most familiar, though the problem arises in all three Services and the factors and possible solutions may well be comparable. It is not proposed to go into the subject in great detail; that would take too long. The aim is rather to provide a basis for consideration.

Field-Marshal Sir Henry Wilson made a remarkable prophecy in 1920. He said: "In a war for national existence you will have to employ the whole nationhood, whether you have got mechanized means or whether you have not."[1] This prophecy came true in the late war. It is the agricultural, industrial and scientific capacity of a nation which makes it strong for modern war. On the other hand, it is fatal for a manufacturing nation such as ourselves to be without either the means of defence or of drawing without hindrance the essential raw materials required from overseas.

In spite of the statements of some of our orators, the new weapons developed during the 1939-45 War will neither result in the abolition of the armed forces nor in their relegation simply to the duties and status of policemen. These weapons will, no doubt, exercise an effect on the methods to be employed by land, sea and in the air, but the issue in the end will depend on the normal armed forces. These forces must, therefore, be maintained and provision made for the necessary modern equipment. So it is still essential to ensure a proper distribution of manpower in peace and war, and that distribution must be sufficiently flexible to admit of the withdrawal of men from some industries and occupations and their employment in the necessary expansion of the armed forces.

Judging by statements in the House of Commons, the twelve-month conscript, if he serves abroad at all, will only do so in Europe. Even if fit for this, he would not be suitable for use further afield. Moreover, it would be waste of shipping space to send such youngsters overseas and bring them back again after a few months. This will mean that the professional soldier, sailor and airman will have to bear the burden throughout the rest of the World. Now the number of Regulars is limited. They have, in addition to the commitments referred to above, to provide large training staffs for the flow of national service recruits, to produce a striking force and also the necessary basis for expansion. There is, of course, the supposition that our commitments will be reduced by impending changes in India and the Middle

[1] At the conclusion of a lecture on "Man Power" by the M.G.A., Aldershot Command, at the Royal United Service Institution in December 1920, published in the Journal of February 1921.

East and by the withdrawal of forces of occupation outside north-western Europe. But it is this long drawn-out aftermath of the last war which is the cause of many of our manpower difficulties, particularly as regards the Army. It involves not only the field formations employed, but also the maintenance of additional headquarters and administrative units, as well as establishments and ancillary services in various parts of the World.

Apart from the short and long term commitments to which reference has just been made, we have the normal defence of the Empire to consider. This may be briefly summarized as :—

(*a*) Keeping open our world-wide communications by sea and air. The Army plays an essential part in this task.

(*b*) Maintaining a striking force or forces to go to the assistance of our garrisons and/or to act as a strategic reserve.

We are, presumably, not to provide a British garrison in India in future, but, on the other hand, we shall be weaker by the loss of the Indian Army. Nevertheless, we shall be forced to maintain formations and garrisons in tropical and semi-tropical countries throughout the World in addition to our long term commitments in north-western Europe.

The number of Regulars available in the Services is at present limited by the difficulty of recruiting and, when this is overcome, by the ceiling imposed by the overall shortage of manpower for our general economic needs. It is suggested, therefore, that the undermentioned are worthy of consideration as a means of applying the principle of economy of force or, in other words, of using our available regular British troops to the best advantage :—

(*a*) Replacement of British troops in the tropics by Gurkhas and African units.

(*b*) Use of women in all tasks for which they are fitted and/or for which they can be trained.

(*c*) Using civilians for employments in and about barracks.

(*d*) Employment of foreigners.

(*e*) By simplicity in administration.

Gurkhas and African Units

It is not making the best use of a British Regular battalion to keep it for three or four years in a single unit station or small garrison in the tropics. Units in such stations tend to deteriorate owing to the climate, boredom and lack of adequate training facilities. Surely it would be better to concentrate all units in certain areas and train them for employment in the more important roles. This is one of the arguments in favour of using African troops in tropical garrisons.

For many years Nepal has provided twenty battalions of Gurkhas for the Indian Army and more when needed in emergency. The population of British West Africa is some twenty-six millions, whilst that of the East African Colonies is about fourteen and a half million ; the two combined being not far short of the total population of the United Kingdom.

The Gurkhas are probably best as infantry, and the units could remain officered and organized as at present. West or East African troops require a cadre of British officers and N.C.Os. These Africans make first-class infantry and light artillery and, as experience has recently shown, can, with a slightly larger proportion of Europeans, be used to form signal, coast artillery, anti-aircraft and mechanical transport units. The prowess of the Gurkha is common knowledge, but in this

country less is known of the soldierly qualities and record of our African troops. The Royal West African Frontier Force and the King's African Rifles from East Africa served with considerable distinction against German-led and trained African troops in the 1914-18 War, as well as against the Italians in Abyssinia and the Japanese in Burma during the late war. The R.W.A.F.F. provided no less than two divisions for the latter campaign. The long-service African is a very keen, smart, well-disciplined and loyal soldier who takes a pride in the Army and in himself.

The following suggest themselves as suitable locations for battalions or other units of Gurkhas and Africans :—

(*a*) *Gurkhas*	(*b*) *R.W.A.F.F. and K.A.R.*
Cyprus	Eritrea (*Occupation Forces*)
Sudan	East Africa
East Africa	Ceylon
Aden	Mauritius
Ceylon	Malaya
Malaya	Jamaica
Hong Kong	Bermuda
Japan (*Occupation Forces*)	

The R.W.A.F.F. and K.A.R. would, of course, remain responsible for the local defence and internal security of the East and West African Colonies including the necessary garrisons for the defended ports. Any of the tasks allotted under (*b*), plus a small striking force, would have to be a charge mainly, if not entirely, on Imperial funds, the Colonies being responsible for the upkeep of the units retained for local defence in Africa. These units would be cheaper to maintain than their British counterparts, but the main contention is that by using these troops the available British personnel and units can be employed to better advantage elsewhere and particularly to strengthen our main striking force.

In the case of the African troops, the trained men are procurable, the base exists and the necessary organization could be called quickly into being. The situation as regards the Gurkhas is more complicated. After the evacuation of India, some form of base would have to be set up, possibly in East Africa or Malaya, with regimental depots and a system of linked battalions. There would be difficulties to be overcome in both cases, but that need not be a deterrent ; too much is at stake.

In this connection, it is interesting to recall that there was some criticism in the Press and elsewhere after the fall of Malaya to the effect that we did not make enough use of the inhabitants of our Colonies. The criticism may or may not have been justified in the case of Malaya, but the Gurkha and African is far better fighting material than could be obtained in that area or in a good many others.

Women's Services

The second suggestion does not at first sight seem to show such a large potential economy in manpower as that outlined above. But, if the tasks which women can perform in peace and war are considered, it does add up to an appreciable figure. Their value in home defence anti-aircraft units is a case in point. One of the factors which must be borne in mind, however, is that many of the jobs they can undertake in peace are unsuitable for them in war—for instance, clerking in the headquarters of a field formation. It follows, therefore, that they cannot entirely supplant male clerks who must be enlisted and trained in peace for service in such headquarters.

On the other hand, there are always large static headquarters at home and abroad which can employ women, and more will inevitably be formed on mobilization. The same applies to signal units. Women can always be employed in static units such as training establishments or schools, and the Services can always use them in depots, etc., at home and abroad, including those on the L. of C. in war. Most of this is well known and the principle seems to be generally accepted, so it is not proposed to labour the subject. But it is referred to because the manpower situation is such that urgent action is necessary to implement the Government's decision to place the Women's Services on a permanent peace footing. Moreover, the uncertainty is bound to have an adverse effect on those now serving who are considering the possibility of becoming Regulars.

Civilian Substitutes

The third proposition, namely the substitution of civilian employees for duties in and about barracks, is one that has been partially adopted in schools, establishments, etc., during the last quarter of a century, but it is doubtful if it goes far enough. It is a reasonable solution when the number of serving soldiers is small or when they are only retained with the Colours for short periods. The Germans employed civilians for the *Reichswehr* under the Weimar Republic and the French Army had employees known as *Agents Militaire* when their term of conscript service was reduced from two years to twelve months between the last two Wars.

The principle should be that no serving soldier is employed on domestic duties which are not part of his training as a soldier. This does not imply that the troops should not keep their own rooms clean, etc.—that is part of their training ; nor does it imply that a proportion should not be trained as cooks. But they should not be called upon for the many temporary or permanent employments and fatigues which are a curse in any peace-time garrison and usually fall most heavily on the Infantry. Pre-war Regular officers will remember the difficulty of getting their " garrison employ " even for the minimum amount of training in spite of the fact that many of them only put in two or three hours work a day at their " jobs." The professional soldier should spend all his time at his proper trade—training for war and not in lounging about in some " employment " or sweeping out the N.A.A.F.I.

In the many training units which must be maintained at home under existing conditions, the trainees cannot be used for fatigues and barrack duties at all—it is as much as they can do to get through the syllabus in the allotted time. This involves the withdrawal of trained soldiers from field formations or the employment of civilians. The actual numbers saved by using civilians may not reach astronomical figures, but the resulting considerable gain in efficiency and contentment should not be overlooked.

It may be argued that this proposal is not a means of economy, as it would involve taking men who could be employed in industry. But many of the " employments " about barracks or within static units and establishments could be filled either by members or ex-members of the Women's Services. For work unsuitable for women there are certainly numbers of partially disabled men, unfit for industrial work, who could be used, and there are pensioners from all the Services who have not learnt a trade but would be invaluable in positions of trust. In any case, the question does not arise until the Services attain their ceiling in professionals.

Employment of Foreigners

The employment of foreigners would appear to be a means of increasing the manpower available to the Services. But it is doubtful if it would be wise to engage

them in large numbers, even if suitable types could be obtained. There would inevitably be the problem of resettlement or naturalization. Moreover, very few foreigners are likely to mix well with our own troops under peace conditions. The alternative is to form foreign units on the lines of the French Foreign Legion. But supposing the difficulties of recruiting, training and organization could be overcome, would battalions of foreigners, even if trustworthy, be suitable as the sole representatives of the British Army in Colonial or other garrisons abroad? We have no problem such as the French had in their occupation and pacification of Algeria, Morocco and the territories of the Western Sudan; in fact we have no field for the employment of such units.

The use of foreigners in any numbers does not appear to be a practical proposition for the reasons stated above, and we have excellent material available within the Empire and from Nepal—men who have been tested and not found wanting, who are a credit to any army and upon whose wholehearted loyalty we can rely.

Simplification of Administration

Finally, there is the plea for simplicity in all forms of administration. It is a very big problem indeed and one which needs a very thorough investigation if real economy is to be achieved. In the case of the Army there is a feeling that we are suffering from over-centralization. Units are burdened with a constant flow of pamphlets, circulars, routine orders and Army Council Instructions. The record and pay office systems might well be reviewed as well as the various checks and audits. After struggling with the reconstitution of the *Reichswehr* in the first decade after the 1914-18 War, von Seeckt wrote: "There are three things against which the human mind struggles in vain: stupidity, bureaucracy and catchwords." We should not allow ourselves to be defeated by any of them.

It has been announced that an Advisory Committee has been set up "To consider the methods of fixing and revising establishments and the use of manpower in the Army." There is much that such a body can do in connection with simplicity in administration. Merely to cut down the establishments of a few units will not achieve the desired economy and may simply lead to inefficiency and misapplication of the personnel in the units.

It would appear, then, that for the object in view the best solution is the employment of Gurkhas and Africans: this would be the major economy. In addition, further economy will be assured by the formation of the Women's Services on a permanent footing. Lastly, the use of civilians, either male or female, to relieve troops of such domestic duties and fatigues as are not part of their training for war. It is submitted that all three should be examined in detail, even if it has been done before. It is hoped that the Advisory Committee will deal with simplicity in administration as one of the means of obtaining economy in manpower.

THE AUXILIARY TERRITORIAL SERVICE AND ITS FUTURE

By CONTROLLER J. M. COWPER, A.T.S.

IT has now been decided that women are to be employed with the Army in peace as well as in war, and in the course of the next year or two the necessary legislation will be passed to establish a regular women's service. This will not be a continuation of the Auxiliary Territorial Service as we know it to-day, for that was an emergency service formed to meet a specific crisis, but a corps of women, the organization and administration of which will be based on the lessons which have been learned by the A.T.S. in the War. The usefulness of this corps will depend on a proper understanding of its function and organization by all who will be concerned in its employment.

The history of women serving with the Army is as old as that of the standing Army itself. In 1690 nurses accompanied King William's army to Ireland and, right up to the time of the Crimea, the soldiers' wives accompanied the Army and served their husbands and their friends on active service. Then in the Crimea came Florence Nightingale and the Nursing Services which are still in existence to-day, but it was not until 1916, during the 1914-18 War, that the idea of having a uniformed and disciplined body of women other than nurses serving with the Army was really explored. Although we did not draw very much on the experience of the W.A.A.C. in the organization of the A.T.S., they were the pioneers without whose work our Service would not have come into existence.

The original conception of the A.T.S. in 1938 was narrow; we were civilians. It is true that we wore uniform, but we did not come under Military Law; we had no military status; we were employed as cooks, clerks, orderlies, drivers and storewomen. We had a ceiling of 20,000. On mobilization that ceiling was immediately raised to 40,000 but it was not, at that time, thought that the Service would ever be employed on more active duties, and the only extension to the employments authorized was the inclusion of signal trades. This civilian status had great disadvantages. It was far from clear how much the A.T.S. was entitled to the normal services of the Army. In one unit, owing to lack of written authority, a quartermaster refused to issue any stores other than straw palliasse covers for the use of the A.T.S. and, if it had not been for the generosity of their landlord who, incidentally, ran a boys' club, they would have had nothing in the way of equipment. In another case the A.T.S. officer had to buy and pay for the food of her women, as, being civilians, the military unit contended that they had no right to army rations. The Directorate of Fortifications and Works, in the original scale for the accommodation of A.T.S. in hutted camps, thought of them in the same way as female N.A.A.F.I. staff and of the A.T.S. officer as a N.A.A.F.I. manageress, and he allowed for an annexe to the women's mess for the use of the A.T.S. officer. It was, perhaps, the status of the A.T.S. officer which was the most difficult to determine: she was not commissioned; she, like her women, was a civilian. Even in those units where it was recognized that she should be given officer status, it was not always clear how this could best be done. In one unit, where the A.T.S. officer was given the use of a room in the officers' mess for her meals, she was solemnly presented with a key to that room so that; when inside, she could lock herself in in order to keep out the licentious soldiery!

It was not until the withdrawal from Dunkirk that the possible usefulness of the A.T.S. was realized. Manpower was short. The three essential things at the time were to defend the Country from air attack, to guard against what appeared to

be almost certain invasion, and to build up a new expeditionary force. The Services needed more men, but the Ministry of Labour was unable to supply them and, in fact, it soon became evident that the deficiency of manpower could only be made good by an extension of the employment of women. The A.T.S. at that time was entirely a voluntary force. Something of the spirit of those volunteers had been seen in the way in which they had risen to the occasion in the crisis following the evacuation from Dunkirk. In one anti-aircraft group, which stretched from the Thames to the Humber, there were thirteen central cookhouses, staffed and equipped to cook for three hundred men, For six weeks during that Summer these cookhouses provided meals for over a thousand men each, not only regular meals, but hot food to men as they arrived in the camps at all hours of the day and night. This is only an isolated instance of the sort of thing that was going on throughout the length and breadth of the land. In an Ordnance Depot the Chief Ordnance Officer came to the women's dinners and explained to them that the British Army in England was without equipment, having destroyed it all on the other side of the Channel. He asked who would volunteer to go down to the Depot and work until every item of equipment had been sent out so that the Army would be in a position to meet the invasion which was hourly expected. Every woman volunteered and worked at the benches for thirty-six hours without a pause, not even stopping for food which was brought round by the cooks on trolleys.

It was the example of these early volunteers which brought to the Army the realization that women could be more generally useful and as a result the Service was given full military status, its ceiling was raised to 200,000 and the number of employments which could be undertaken by its members was raised to over a hundred. These included some of the more skilled trades entailing as much as six months training. So from 1941 to 1943 the A.T.S. rapidly grew but, in 1943, the supply of women dried up. The result of this was that, at one time, auxiliaries were, in their turn, replaced by category men so that they might be released for more active work at home and overseas.

Full military status included the application of the Army Act to women in a modified form. Only Sections 15 and 40 were applied to the A.T.S., and auxiliaries could therefore be charged only with the offence of absence without leave or conduct to the prejudice of good order and discipline. It is one of the regrets of the Service that, when Section 40 was applied to the A.T.S., the word " military " was taken out and auxiliaries cannot therefore be charged with offences to the prejudice of military discipline. Punishments were restricted to CB and forfeiture of pay. No form of detention was ever authorized and the result of such limited powers meant that they were totally inadequate to deal with the persistent offender. Even their use in cases of minor offences had to be carefully watched, for there were no greater powers to be used for the more serious crimes. Discipline had to be maintained by pure leadership and example and, at the time, the difference between the penal codes of the men and the women was one of the strongest reasons why it was decided that the A.T.S. should be a women's service, controlled and administered by women, rather than be integrated into the Army. Experience has since shown that this was a wise decision. It is logical in a tribal organization such as the Army to organize the women into a tribe of their own ; the Service is far more flexible than if the women formed part of the corps with which they work, and women can easily be transferred to the place where their services are most urgently needed. It was also realized that, if there were to be no women's services, there would be no senior women officers and no possibility of a woman making the Service her career. This argument, important in war, is even more important in peace.

So the A.T.S. was organized as a separate Service. The organization was complicated. Its primary object was flexibility so that the needs of the Army could be served while at the same time the status of the women's service was safeguarded. In most military war establishments at home and a great many overseas, A.T.S. were shown on the establishments. In some cases they were in fairly large numbers; in others they were in ones and twos. It followed that it was possible to have in one place two A.T.S. employed by the Railway Transport Officer, two by the Officer in charge of Barracks, three by the Command Supply Depot and so on, making a total of, say, fifty in one location. Those fifty would be organized into a platoon, platoons grouped together in companies and groups, each commanded by an A.T.S. officer. The result of this organization was that it was quite a common occurrence for an A.T.S. company to serve from twenty to thirty units, and the efficiency of that company depended to a very large extent upon the relationship between the A.T.S. and military officers. A.T.S. groups came under the direct command of the District Commander and, from the District upwards, the power of command over male and female personnel was vested in the Commander at all levels. An A.T.S. officer was appointed to the staffs of Army commanders and District commanders, and the Director A.T.S. was one of the directors in the Adjutant-General's Department of the War Office. The responsibility of these officers is to advise the commander on any matter affecting the A.T.S. and to be a channel of communication between A.T.S. units and the War Office on purely A.T.S. matters.

The result of this organization was, in the first place, to provide a framework sufficiently elastic to meet sudden needs in any part of the World. Where the Army needed A.T.S., there they were employed. It is true that, because the location was unsuitable or because of administrative difficulties from the A.T.S. point of view, it was not always possible to employ women in every place where they were shown on establishment, but these were exceptions and, as a rule, A.T.S. could be employed where they were needed by the Army, the organization being built up according to their location.

The second and most important result of this organization was an esprit-de-corps of a very high order. In 1942, General Sir Ronald Adam—then Adjutant General, was lecturing to A.T.S. officers when the organization had been in being for about a year. The Service was desperately short of women and the Army was desperately short of men and it appeared to a great many people that the A.T.S. administrative organization was extravagant in womanpower. Some A.T.S. officers were not convinced that the Service was being as useful to the Army as it might have been had it been integrated with the units with which the women were employed. Somebody asked the Adjutant-General whether it would not be better to go back on the original decision of maintaining a separate A.T.S. organization. His reply left no doubt in the minds of his audience that, in the opinion of the Army Council, the benefits derived from the A.T.S. unit organization far outweighed any disadvantages, and the organization has been maintained ever since.

The present policy is that all orders shall go through normal military channels after having been agreed by the A.T.S. staff at all levels. Some instructions, affecting one or other side only, may be promulgated to military or A.T.S. commanding officers alone but, as a general rule, they should be sent out to both simultaneously. Where this has not been done it is necessary for the commanding officers concerned to keep each other fully informed.

As far as the future is concerned it has been decided that there shall be, not only a Regular women's service, but also a Territorial Army women's service. Their

organization must be such as to make them most useful in peace and easily expanded in war. The basis of this organization will be the same as it has been during the War and its success depends on a real understanding between those military and A.T.S. officers who will be concerned with it. The first and most important thing for the A.T.S. officer is that she shall have a real understanding of the work which the women under her command are expected to do and the requirements of the military units served. A.T.S. officers are not merely welfare or administrative officers, but commanding officers and, in order efficiently to command, they must understand the work of their units. It is here that the military commanding officer can be of such great assistance in facilitating the work of the A.T.S. officer. Secondly, having understood the work required of her women, the A.T.S. officer must so organize her command that the requirements of all military units served are fulfilled. This is not always easy. In a company serving from twenty to thirty units their requirements may be very different but, if she understands them, the A.T.S. company commander can usually find a way of supplying them. This understanding and smooth cooperation is far easier to attain in those units where the social relations between military and A.T.S. officers are good. It is far easier to understand the problems when the people concerned know each other as people and not only as business associates. As the A.T.S. platoon, company and group commanders are entirely responsible for their commands they are in a position to deal with the problems as and when they arise, but where, having tried every method of solving a problem, agreement cannot be reached, the A.T.S. commanding officer has the right of appeal to the A.T.S. staff officer at the next higher formation.

As far as the military commander is concerned, he also needs a real understanding of the problems confronting the A.T.S. officer. It is essential that military officers employing A.T.S. should understand their regulations and the reason for them. Good social relations with the A.T.S. officer are of the same value to the military commander as they are to the A.T.S. His interests are also safeguarded by a right of appeal. There are some military establishments employing so many A.T.S. that they have their own A.T.S. group and their own A.T.S. commander, but the majority of units employing A.T.S. have only companies or parts of companies working for them. Usually, therefore, the military commander deals with a junior officer. Where, for some reason, they fail to agree, all military commanders have direct access to the A.T.S. group commander and the matter can usually be dealt with on unit level. If, however, agreement can still not be reached the matter can be reported through the usual channels to District Headquarters, where, as both military and A.T.S. units come under the command of the District Commander, a decision can be made.

Experience has shown that, particularly from the point of view of flexibility, the existing organization appears to satisfy best the needs of the Army and that, although there are obvious difficulties, they are rapidly diminishing as it is better understood. The essential thing is to reduce to a minimum any suggestion of divided loyalty on the part of the auxiliary. The object of military and A.T.S. officers is the same, that is the efficiency of the auxiliary. This must be made perfectly clear to all ranks of the Army and the A.T.S., as the success or failure of a unit depends very largely upon it.

INCENTIVES TO RECRUIT

By Colonel J. G. Runciman, *late* Royal Tank Regiment

THE future of the Regular Army is a problem that vitally concerns everyone not only in this country, but throughout the Empire, but it is one which often fails to get the sympathetic consideration it deserves.

The introduction of compulsory military service in time of peace has not made voluntary enlistment any more popular. It is not merely that the prospective Regular now has an opportunity to try Army life before committing himself, but the whole attitude of the conscripts towards military service tends to discourage any of their number from voluntarily undertaking further service.

There are many who look upon compulsory military training as a good means of raising the moral and physical standards of the youth of our nation, but probably the large majority of the people deplore the necessity for conscription in any form, and many dispute the moral value of military discipline.

Whatever our own views on the subject and our opinion of the Army as a career, we must take into account public feeling. If we fail to give it full weight, then it will be useless to expect the public to provide a voluntary Regular Army. The taxpayer will grudge the price and, except in times of large scale unemployment, the necessary number of volunteers will not be forthcoming. To ensure a good flow of voluntary recruits, service in the Regular Army must be made a career of which any man can be proud. That is to say, not only must the standard of life be high and conditions of work and leisure be congenial, but above all the work must obviously be of real value and importance to the Country.

In time of war there is no lack of respect and admiration for the front line soldier, and there is even a good deal of reflected glory on anyone who wears khaki. But during the years of peace, the emphasis is on the other side of Army life. All reasonable men recognize the need to pay some national insurance premium, but many complain that the Army for which they pay is not the one they get. The soldier, they say, spends little time on training for war and most of his time on leave, playing games or doing unnecessary and useless duties and parades. The war experience of many temporary soldiers did not tend to reassure them that the life of a soldier in peace is not one of comparatively aimless idleness.

Let us face the facts and try to find a solution that will rid the Army of what grounds there are for such criticism and so give us the voluntary Army we need.

Some Facts

There can be no disputing that a very large part of many a soldier's time before and during the War was wasted. The time spent by the patient housewife in queues was nothing to that spent by the average soldier as a recruit waiting his turn to handle the meagre equipment available, and as a trained soldier for weeks or months in some holding unit or transit camp. The majority of Regular soldiers between 1918 and 1939 were never fully trained, and a very great number went into the Reserve at the end of their Colour service almost completely untrained in any form of fighting.

There were two main reasons for the low standard or lack of training; one was the universal shortage of modern equipment with which to train, the other was the system whereby all the administrative and domestic duties of a unit were carried out by men enlisted under the same conditions as the machine gunner, the tank driver or the gunlayer.

The lack of training equipment and training facilities generally was largely a question of finance ; the people of this country were unwilling to pay for a Service of whose necessity and value they were not convinced. The number of ex-soldiers with no special qualifications entering the labour market every year only helped to confirm public opinion.

Admittedly, peace and war establishments allowed for a proportion of " employed men "—batmen, mess waiters, cooks, mess orderlies, storemen, clerks, police, etc., but every unit had to employ extra men permanently and also detail daily duties such as cookhouse and mess room parties, room orderlies, coal fatigues and so on. All these employed and temporarily employed N.C.O's and men had to be relieved periodically for short periods of training, and for annual and casual leave ; and they naturally expected the same time off for sport and recreation as the others. Education, a very good thing in itself, cut right across all training and work programmes.

It did not matter greatly how the " duties " were detailed and reliefs arranged ; the result was much the same in the end. The individual soldier at best received throughout the year two or three short periods of continuous individual training followed at intervals of weeks or months by a short period in practice camp or some form of collective training. It is not suggested that the soldier was idle and did no useful work, but except for such as drivers, mechanics or signallers actually operating a station, few men ever put their training into practice and at the end of the year they had retained little of what they had learned.

There were, of course, safeguards designed to keep up the standard of training, *e.g.*, minimum standards were fixed for qualification for proficiency pay and trade pay. But it is easy to coach men through a trade test and difficult to prevent the pass standard from being gradually lowered. In 1940-41, Royal Armoured Corps training regiments were actually trade testing and mustering as driver-mechanics men whose total practical experience was only a few hours driving and maintenance on an obsolescent vehicle.

A Solution

In the Army of the future there should be a clear-cut distinction between the fighting soldier and the domestic and administrative worker. The former should be enlisted as at present, but the latter might well be enrolled and allowed to continue in the Service indefinitely. Most of the " employed " duties could be carried out equally well by men up to fifty or sixty years of age or by women.

The enrolled personnel required for service abroad might be required to sign a contract for three years, but otherwise they should be free to seek other employment at short notice. In most cases, one month would be sufficient ; in no case need the notice exceed three months. Hours of work, rates of pay, annual holidays, bonuses for length of service, extra pay for overtime or temporary duty away from home should conform to civilian standards. They would be free to arrange their own accommodation, but hostels would have to be provided for some of them. They might be under a modified military discipline while on duty or when serving abroad, but otherwise should be their own masters. The wearing of a common uniform would be unnecessary, but it should be provided for barrack police, night watchmen and others in similar employment.

It may be a little difficult to fix the exact dividing line between enlisted and enrolled personnel, but as a rough guide those whose duties require them to have some form of " battle " training might be enlisted and those whose military training in war need go no farther than the handling of a personal weapon might be enrolled.

The form of enrolment would be varied to suit the type of employment, but there would be room for promotion in the Service for all men within their own class. For example, the catering branch would not only provide cook-sergeants, but officers and sergeants mess caterers and mess staffs for all ranks. Enrolled clerks and storemen would claim most of the " Q " appointments and even " general duties," including sanitary men, sports storemen and groundsmen, room orderlies, range wardens and various barrack services would provide a proportion of better-paid jobs as an incentive.

It may be objected that this scheme would cut down the reserve available at any time. It would do so on paper but not in fact. If, all the time, material and money available is concentrated on training the enlisted man he will go into the Reserve a highly-trained, physically fit and mentally alive man worth in immediate value at least three times that of the half-trained man who rejoined in 1939; and the paper Reserve will be a true figure and not one resulting from wishful thinking.

It would, of course, be necessary to supervise much of the work of the enrolled personnel on a garrison or area basis rather than on a regimental one, but modern weapons and methods will tend to concentrate the home Army in training centres, and it would be more economical in manpower and money to do so.

With enrolled service providing permanent employment for those who wish it under conditions similar to those in the general labour market, there would be no need to worry about their return to civil life. Opportunities and facilities for education there should be, but they should be provided in the man's own time and not in working hours. Recreation and sports would probably be much more readily available than they are to the average worker.

The Fighting Soldier

On the other hand, the infantry rifleman, the mortar and machine gun crews, the artillerymen, men of the Armoured Corps, field engineers, signallers and all those liable to be fighting in close contact with an enemy will have to be highly trained specialists with long practical experience in carrying out their work under near-battle conditions. They must be physically fit, mentally alert, well educated, very well disciplined and proud of their job. They must know how to work hard and play hard. At the end of their service, they want to be assured of a good start in civil employment and, therefore, their education must include a course of sound business or vocational training. If they are not required to spend two-thirds of their service on guards, cookhouse and coal fatigues and a hundred and one domestic duties, there will be ample time for a thorough progressive training.

If we allow four months of the year for collective training and annual leave, there remains eight months when, except for sickness, every soldier should be at the disposal of his Commanding Officer for military training or duty. Enlisted men should never be employed on domestic duties, but if occasional extra labour is required for short periods on such work as road making and drainage in camps or training areas or unloading and handling heavy stores, the work should be carried out by officers, N.C.O's and men together as a battle task to be completed with the maximum efficiency in the minimum time. There will have to be periods of continuous training day and night, but normally a soldier might work a five-day week. Out of that complete week, a Commanding Officer would gladly spare one full day for education.

One does not train an athlete by making him run the full distance every day, but one of the essentials in his training is that whatever he sets out to do he finishes.

Far more attention should be paid to the soldier's moral training—his self-discipline, his endurance, his powers of concentration, his thoroughness in whatever job he undertakes. Many a soldier has chosen "employment" because it offered an easy existence, few parades and no one to "boss" him, but the very fact that so many preferred these duties only goes to prove the demoralizing effect of the old system.

The Real Incentive

If a man on enlistment knew that he was going to spend five or six years in being trained to concert pitch in a highly skilled job with the possibility, by no means remote, of having to put his training to practical use in his Country's service, and if, at the same time, he had the opportunity to prepare himself for a good job in civil life, there should be no shortage of good recruits. It is not the uniform that attracts recruits, it is what the uniform represents. Make that something worth while and the men will come.

A good education and vocational training of the standard necessary to ensure immediate acceptance by trade unions and professional associations will require schools and colleges with full-time professional teachers. If we look ahead and plan our home stations with a view to centralized administration and education, it will, in the long run, assist in collective training. The Country cannot have an Army without paying for it, but if during a man's service we can raise his physical, mental, moral and educational standard above that of his civilian brothers we are buying a permanent asset, and not merely paying a heavy annual insurance premium. It can be done; and every soldier on return to civil life can be made not only a better man, but one better fitted to take his place in the work and life of his Country. That is the solution to the problem of maintaining a voluntary Army in times of peace and prosperity which we all hope are on the way.

COASTAL COMMAND IN THE VICTORY IN EUROPE

By Air Vice-Marshal A. B. Ellwood, C.B., D.S.C.

On Wednesday, 16th April, 1947, at 3 p.m.

Admiral Sir Charles Little, G.C.B., G.B.E., in the Chair

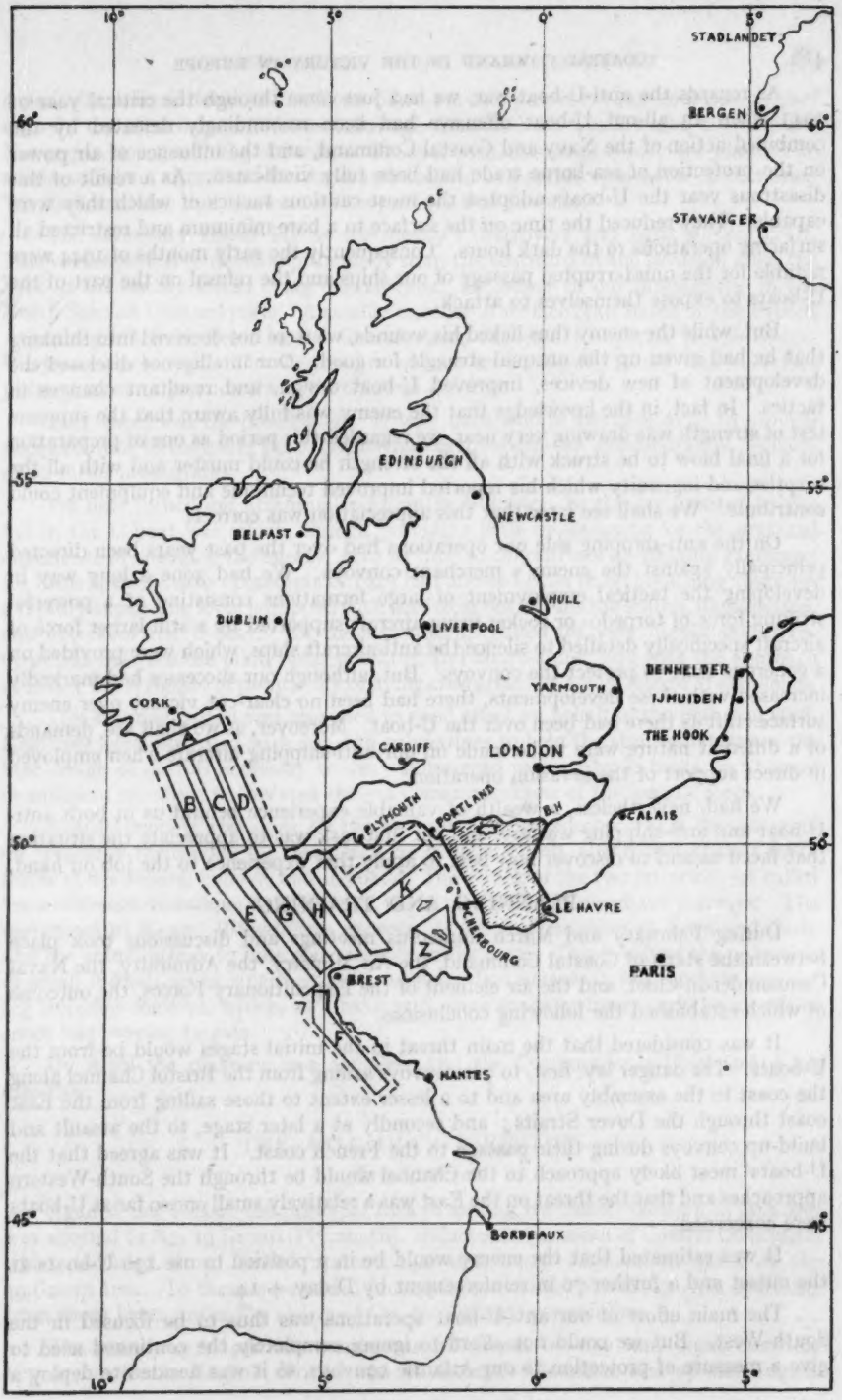
The Chairman, on introducing the Lecturer, said that he was flying in the Royal Naval Air Service during the 1914–18 War, and then transferred to the Royal Air Force. After normal service in the R.A.F., which was not particularly connected with the sea, he found himself Air Officer Commanding No. 18 Group, Coastal Command in 1943–44, and from that command he moved on to become the Senior Air Staff Officer to Sir Sholto Douglas—C.-in-C. Coastal Command.

Sir Sholto Douglas was originally billed to give this lecture, but it was easy to understand that he had not been able to find time to come here. However, we were very much indebted to him for putting us on to such a very fine substitute as Air Vice-Marshal Ellwood.

LECTURE

THE invasion of Europe has been rightly recognized as the greatest Combined Operation of all time. It was the shining example of successful co-operation between land, sea, and air forces; of the process of combined planning from the broad strategical conception down to the smallest tactical detail; of the triumph of secrecy and deception in the execution of a project of which the imminence was, nevertheless, as well known to our enemies as to ourselves. To the onlooker many aspects of this combined achievement stood out in sharp relief. The carriage of the invading forces across the sea by the Navy under the protection of fighter aircraft; the support given by our strategical and tactical air forces; the guns of the bombarding ships; the construction of artificial harbours; the operations of the airborne troops. All these were there for all to see as this colossal undertaking progressed. But the contribution of Coastal Command, in itself less spectacular and less obviously connected with the physical act of invasion, was deliberately kept from the public eye in order to maintain the shroud of secrecy which was so vital to its success. In fact, however, as I shall try to show, the operations of Coastal Command were just as much an integral part of the Invasion plan as were those of any other participant, and in the event were the first to be given active expression.

The jealously guarded secret of the area of assembly, route, and destination of the invading forces is now common property. This area, commonly known as "The Spout" is shown in the shaded portion on the map. The task allotted to Coastal Command was to protect this area and the sea approaches to the point of assembly—to hold the ring, as it were—against indentation by enemy under-water and surface attack. The Command had, therefore, two distinct roles, namely, the attack of the U-boat and the attack of surface craft. The technique of these two roles being widely different, it was necessary to employ entirely separate squadrons for the performance of each. These squadrons—the anti-U-boat and the anti-shipping, had of course been actively engaged throughout the War in progressively larger numbers, and it may be well for me at this stage to describe very briefly the situation in the anti-U-boat and anti-shipping spheres as it stood in the early months of 1944 when the process of planning for the Invasion was in full swing.



COASTAL COMMAND
IN THE INVASION OF EUROPE, 1944

As regards the anti-U-boat war, we had just come through the critical year of 1943 when an all-out U-boat offensive had been resoundingly defeated by the combined action of the Navy and Coastal Command, and the influence of air power on the protection of sea-borne trade had been fully vindicated. As a result of this disastrous year the U-boats adopted the most cautious tactics of which they were capable. They reduced the time on the surface to a bare minimum and restricted all surfacing operations to the dark hours. Consequently the early months of 1944 were notable for the uninterrupted passage of our ships and the refusal on the part of the U-boats to expose themselves to attack.

But, while the enemy thus licked his wounds, we were not deceived into thinking that he had given up the unequal struggle for good. Our intelligence disclosed the development of new devices, improved U-boat design, and resultant changes in tactics. In fact, in the knowledge that the enemy was fully aware that the supreme test of strength was drawing very near, we regarded this period as one of preparation for a final blow to be struck with all the strength he could muster and with all the surprise and ingenuity which his reported improved technique and equipment could contribute. We shall see later that this appreciation was correct.

On the anti-shipping side our operations had over the past years been directed principally against the enemy's merchant convoys. We had gone a long way in developing the tactical employment of large formations consisting of a powerful striking force of torpedo- or rocket-firing aircraft supported by a still larger force of aircraft specifically detailed to silence the anti-aircraft ships, which were provided on a generous scale to protect the convoys. But, although our successes had markedly increased with these developments, there had been no clear-cut victory over enemy surface craft as there had been over the U-boat. Moreover, as we shall see, demands of a different nature were to be made on our anti-shipping aircraft when employed in direct support of the invasion operation.

We had, nevertheless, a wealth of valuable experience behind us in both anti-U-boat and anti-shipping warfare, and our first task was to appreciate the situation that faced us and to discover how best to apply that experience to the job on hand.

PLANNING AND TRAINING

During February and March numerous meetings and discussions took place between the staffs of Coastal Command, the Air Ministry, the Admiralty, the Naval Commander-in-Chief, and the air element of the Expeditionary Forces, the outcome of which established the following conclusions.

It was considered that the main threat in the initial stages would be from the U-boats. The danger lay, first, to our convoys sailing from the Bristol Channel along the coast to the assembly area and to a lesser extent to those sailing from the East coast through the Dover Straits; and secondly at a later stage, to the assault and build-up convoys during their passage to the French coast. It was agreed that the U-boats' most likely approach to the Channel would be through the South-Western approaches and that the threat on the East was a relatively small one so far as U-boats were concerned.

It was estimated that the enemy would be in a position to use 130 U-boats at the outset and a further 70 in reinforcement by D-day + 14.

The main effort of our anti-U-boat operations was thus to be focused in the South-West. But we could not afford to ignore completely the continued need to give a measure of protection to our Atlantic convoys, so it was decided to deploy a

drastically reduced force on the West Coast for this purpose. Nor could we neglect entirely the movement of U-boats through the Northern Transit area between the Norwegian coast and the Atlantic. To deal with this contingency we planned to retain sufficient aircraft in Scotland and Iceland to provide thin cover in this area. We shall see later that we were well repaid for this decision.

The secondary threat lay in the enemy's destroyers and light surface craft. This was expected to develop principally from the eastward of the invasion area, the bulk of the enemy forces being concentrated, according to our intelligence, in the North Sea and Channel ports. A smaller number of surface craft based on the French Atlantic ports from Brest to the Gironde were expected to operate in the South-Western approaches. The disposition of our anti-shipping forces was therefore planned so as to provide the main effort in the East.

This, then, was the broad plan. It was made well in advance so as to provide adequate time to complete the extensive moves involved—an administrative problem of no mean proportions.

We now turned our attention to intensive training. In this we profited by the lull in the U-boat war which, though providing little opportunity for the practical experience of engaging the enemy, gave us time to concentrate on training exercises; for these the intensive operations of 1943 had allowed little or no breathing space for a rapidly expanding force equipped with the latest devices for the search, illumination, and attack of the U-boat. All these operations called for very highly skilled co-operation between the pilot, radar operator, and bomb-aimer, and with the approach of D-day the standard of proficiency of flying crews reached a high degree of excellence.

This training period was also used to good effect on behalf of the planning staff. Exercises were organized with our own submarines to help the staff to determine the best design of patrols necessary to deny submerged passage by U-boats up Channel in sufficient numbers to threaten the sea communications of the assault force.

Similar training was done by the anti-shipping squadrons, which concentrated on preparing themselves for the attack by cannon, bomb, and rocket against small forces of destroyers, E-boats and R-boats. The attack of the two latter classes called for a different technique from that of the attack of large merchant convoys. The movement of E- and R-boats was expected to occur principally at dawn and dusk, and the actual attack to take place usually in the dark. This involved the operation of small formations or single aircraft as opposed to attack in full daylight against big shipping convoys, which, as I have said, were made in force, and the attack of small fast moving targets.

By April the planning was complete and the Commander-in-Chief issued his directive.

THE A.O.C.-IN-C's DIRECTIVE

Anti-U-Boat

Against the U-boat the principal task of sealing the South-Western approaches was allotted to No. 19 Group (Plymouth). Nineteen squadrons of Coastal Command, which included three United States naval squadrons, were concentrated in the 19 Group area. To these were added four squadrons of the Naval Air Arm operating from shore bases under the orders of the Air Officer Commanding.

The plan was to provide continuous air patrol by day and night over the approaches to the English, Bristol and St. George's Channels, and up the English

Channel as far as the western edge of the Cherbourg Peninsula. To achieve this, patrols were arranged in parallel " boxes " each suitable to be covered by one aircraft and each allotted a letter. The width of each " box " and the space between one " box " and another were determined by the distance at which a U-boat could be detected by the aircraft's radar equipment, and the timing of the aircraft's patrol round each " box " was so calculated to ensure that no U-boat could stay surfaced for more than half an hour without being spotted and attacked. In general shape and character the design as a whole was made to satisfy the principle of the " cork in the bottle." A glance at the map will show how tightly the " cork " fitted into the bottleneck of the English Channel. Thus, although each " box " was self-contained and independent of its neighbour the complete design could be treated as one moveable whole. This was a very important characteristic because, not only could any one " box " patrol be reinforced at short notice by the issue of simple orders, but the whole effort could be pushed up the Channel or withdrawn, or transferred from one part of the area to another at will, thus preserving flexibility without detriment to the principle.

You will see that the southern parts of the " cork " lay close to the French coast where the danger of attack by enemy fighter aircraft was serious. To guard against this, protective fighter cover was provided by the Air C.-in-C., A.E.A.F.[1] It was never expected that this threat of fighter attack would persist beyond the opening phases of the operation, because it was appreciated that all the enemy fighters would then be too heavily engaged on combating the main attacking air forces. But it was considered more than probable that the U-boats might take up preliminary dispositions before D-day, prompted either by a leakage of information or by rehearsals being mistaken for the genuine operation, and it was then that we felt that the enemy would be in a position to spare his fighters to cover the operations of what was perhaps his most important anti-invasion weapon, namely, the U-boat. In the event, however, he made no attempt to interfere with our anti-U-boat aircraft, having decided, no doubt, to conserve his fighters for the main air battle, and after a day or two our protective fighter patrols were withdrawn and freed to take part in more profitable and exhilarating operations.

Protection against enemy long-range fighters, which we expected to encounter on the western fringe of the " cork " area, was provided for by two squadrons equipped with cannon-firing Mosquitoes and Beaufighters.

The tactical conception of the " cork " was, of course, essentially offensive, the object being to sight and attack any U-boat attempting to penetrate the vital area at any point within it, and quite unrelated to the routes of the invasion convoys along the coast or across the Channel. All the nineteen Coastal Command squadrons in the 19 Group area and two of those in the 15 Group area were allotted to this role, making a total of 21 squadrons for offensive operations in the South-West.

But the close protection of the convoys as they crept from the Bristol Channel round Lands End and along the South coast was not forgotten. For this task the four Naval Air Arm squadrons proved an invaluable addition to the Command's resources. With their short range they were admirably suited to this operation and filled an important gap in our plans for which the use of aircraft of long range and endurance would have been most uneconomical.

On the West coast, No. 15 Group (Liverpool) retained only four squadrons, primarily to provide cover for the Atlantic convoys (though, as I have already said,

[1] Allied Expeditionary Air Forces.

it was found possible to allot two of them to the offensive role), while a further four were divided between Iceland and No. 18 Group (Rosyth) to deal with U-boats making the passage between the Norwegian coast and the Atlantic.

On the East coast, close escort to coastal convoys was provided by Naval Air Arm aircraft, but to meet any intensive U-boat activity in this area we relied on a plan for the move of anti-U-boat squadrons from the West. As was expected this threat never materialized.

Anti-Ship

In the anti-ship plan the leading role fell to No. 16 Group (Chatham) in whose area five Beaufighter squadrons were deployed and given the task of hunting enemy destroyers, torpedo boats, and E-boats in the southern part of the North Sea and the eastern approaches to the Channel. The operations of these aircraft were to take the form principally of sweeps at dawn and dusk, but arrangements were made for forces to be ready at immediate call to attack any targets reported by reconnaissance aircraft by day or night.

A flight of Wellingtons was specially trained for night reconnaissance, its duty being to locate enemy surface craft by radar and then to illuminate the target for Beaufighters directed to the attack as a result of the Wellingtons' reports. The Wellington reconnaissance was also used on behalf of our own surface craft.

Another valuable element in the anti-ship plan was provided by one Naval Air Arm squadron equipped with Swordfish and a flight of R.A.F. Albacores. Though under the orders of the A.O.C., No. 16 Group, these aircraft were actually controlled from the ground by No. 11 (Fighter) Group, the technique of bringing them into contact with their targets being similar to that used for the interception of enemy aircraft by night fighters.

On the West coast, No. 19 Group were similarly equipped but on a smaller scale. The main striking force consisted of two Beaufighter squadrons, and these were also supported by a flight of Wellingtons and a flight of Albacores. The role of these aircraft was broadly the same as that of the 16 Group forces, but was expected to be concerned rather with the attack of destroyers operating from the French Atlantic ports than of E-boats, which were not expected in such numbers as in the East. This in the event proved to be an accurate appreciation.

A potential addition to the anti-ship forces in this area existed in the two long-range fighter squadrons, equipped with Mosquitoes and Beaufighters, whenever they could be spared from their primary task of protecting our anti-U-boat aircraft against long-range enemy fighters.

Before going on to describe the operations of Coastal Command as they subsequently developed, I should perhaps emphasize that the whole essence of the plan and of the disposition of squadrons as I have outlined them was flexibility and the provision for rapid reinforcement of one area at the expense of another should events take an unexpected turn.

THE BATTLE WITH THE U-BOATS

In fact this became necessary at the very start of the campaign which, for Coastal Command, opened in the middle of May, and not in the invasion area, but in the far North.

The enemy made a determined attempt to reinforce his U-boat fleet in the Bay of Biscay by moving large numbers of boats from Norway. This move was detected

on 16th May, and No. 18 Group, reinforced by squadrons from No. 15 Group, and Iceland, immediately took the offensive. These operations profited by the enemy's anxiety to make his passage with all possible speed, and from the almost continuous daylight which persists in these latitudes at that time of the year. Added to this was the fact that few of the U-boats had as yet been fitted with the *schnorkel*, which enabled them to charge their batteries and get air into the boats without surfacing. They returned to their old tactics of trying to force their way through on the surface, relying upon their anti-aircraft guns to fight it out with attacking aircraft.

Throughout the rest of May there were almost continuous sightings and attacks and, after a short lull, the enemy, on D-day, sent out his remaining operational U-boats in Southern Norway, some destined for the Bay of Biscay and some to maintain a defensive line off the Norwegian coast to guard against a suspected Allied landing in those parts.

All through June and up to mid-July fiercely contested actions took place from the South-West coast of Norway up to a latitude of 70° North, where the enemy tried to work round into the Atlantic out of range of our aircraft. Undaunted, however, our aircrews maintained their operations at distances of no less than 850 miles from base and defeated the attempt.

During this period—mid-May to mid-July—75 U-boats were sighted and 51 attacked. Eighteen were sunk and nine seriously damaged. Nine of our aircraft were lost and many more suffered severe damage and crew casualties from the U-boat flak. These high casualties may be readily understood when it is realized that an attacking aircraft makes a straight run-in at a height of 50 feet and in so doing presents a non-deflection target to a U-boat armed with one quadruple and two twin 20-mm. cannon. There were many attacks of outstanding gallantry, two of which earned the Victoria Cross for the two captains of aircraft, and on several occasions the killing of a U-boat involved the simultaneous loss of the aircraft.

These early anti-U-boat operations in the North augured well for our prospects in the area of the main battle in the South-Western approaches. Here the limited size of the area to be covered and the numbers of aircraft at our disposal made it possible, for the first time, to design our patrols on the exact pattern which scientific research and planning had established as the nearest guarantee against the passage of a U-boat through a specified area.

We had only two anxieties. One was the extensive use of the improved U-boats and equipment of which we had heard so much. The ability to advance at greatly increased submerged speeds and, by the use of the *schnorkel*, to dispense with the need to surface would, in the absence of practical experience of such conditions, have seriously hampered our operations. The northern battle, however, made it clear that those U-boats at least were restricted to known methods of operation and it was confidently hoped that the same would apply to the South-West. And so it turned out.

The other anxiety was the fear of serious interference by enemy fighters with the anti-U-boat aircraft operating close to the French coast. As I have already mentioned, we guarded against this by the provision of protective fighter cover. But even so the intervention of enemy fighters, had it materialized, would have been a considerable embarrassment.

The final preparations for the Invasion assault and the large-scale rehearsal exercises at the end of May produced no marked reaction on the part of the U-boats in the Biscay ports, but on D-day they reacted promptly and strongly. Out they

came—helter-skelter; forty of them. Again they threw caution to the winds. Speed was all that mattered. Some made direct for the Channel, some to waiting areas in the South-Western approaches, and others to form a defensive line against a possible Allied assault on the Biscay coast.

During the period 6th–10th June, Coastal Command aircraft sighted 36 U-boats and attacked 23 of them—all on the surface and 16 at night. In every case the U-boats stayed surfaced and fought back fiercely. Six were sunk outright and five were so badly damaged that they had to put back to harbour. Again there were some outstanding performances by the aircraft crews, the most spectacular perhaps being the sinking of two U-boats within twenty minutes of each other by the same aircraft. Not one U-boat succeeded in reaching the convoy lanes or the assault area during this vital period.

So ended the first and, as it turned out, the decisive phase of the U-boat challenge to the invasion of France. The onslaught of Coastal Command's aircraft compelled the U-boats once more to revert to diving tactics. After 10th June only those fitted with the *schnorkel* attempted to interfere with our convoys which were now pouring a constant stream of reinforcements and supplies into our bridgehead across the Channel. Such U-boats as did make the attempt were harried remorselessly by aircraft and surface hunting groups. A few managed to penetrate the Central Channel area and a few operated close inshore off the Cornish and Devon coasts, but their successes were negligible.

As before, these ultra-cautious tactics reduced the rate of U-boat kills, and during the rest of June Coastal Command accounted for only one sinking by aircraft alone and shared two with naval escort craft. Three more were sunk by naval craft alone.

By mid-July the U-boat threat to the Invasion operations was virtually over. As our armies swept towards the Biscay ports the U-boats prepared to get out, and on 15th August a general evacuation started. Fully operational boats were sent into the Western approaches, the Bristol and North Channels, and the Minches. The rest set out on the long trek to Norway keeping well out in the Atlantic.

This wholesale evacuation produced many encounters off the Biscay coast, in the course of which Coastal Command sank three U-boats and damaged four, and shared three further kills with the naval escort group operating in the area.

In the whole battle in the North and South from 16th May to the end of August, Coastal Command aircraft sank 30 U-boats outright, shared five more kills with the Navy, and damaged 26 U-boats. For these successes we paid the price of a total of 69 aircraft, 45 being lost in action with the enemy and 24 through the hazards of maintaining our patrols consistently in fair weather and foul.

Of all the hundreds of vessels which took part in the invasion expedition and its maintenance the U-boats succeeded in sinking only nine ships and damaging another seven.

ANTI-SHIP OPERATIONS

To turn now to anti-shipping operations. Soon after the initial assault the enemy attempted to bring his destroyer force based on the French Atlantic ports into the battle area. Three destroyers were attacked by a force of Beaufighters from 19 Group, South of Brest, on 6th June. This attack delayed their progress for two days in Brest and on the night of the 8th/9th June, after resuming their journey, they were spotted and reported round the Brest Peninsula by our aircraft, intercepted

by a naval force and brought to action. One was sunk outright, one forced on the rocks and the third driven back to Brest. Salvaging of the beached destroyer was made impossible by a further attack by Beaufighters. This saw the end of the enemy's attempts to reinforce from the West, the only two remaining destroyers being withdrawn to the Gironde.

In the battle area E-boats, of which there were about thirty based on ports between Boulogne and Cherbourg, were very active. Frequent attacks by Beaufighters, Albacores, Avengers and Swordfish were made, mostly at night. Against these small fast-moving targets it was difficult to achieve conclusive results, and definite sinkings could not be claimed in great numbers. It was obvious, however, that our harassing attacks were having the effect of completely upsetting the enemy's offensive plans and his E-boat operations were rendered virtually ineffective.

Attacks also took place on enemy M-class minesweepers and armed trawler escort vessels, and the Wellingtons did useful reconnaissance work at night dropping flares and directing our own naval forces to located targets. An outstandingly valuable contribution to the neutralization of the enemy surface forces was made by devastating attacks by Bomber Command on concentrations of light craft at Le Havre and Boulogne. By the end of June Cherbourg had fallen, which not only cut the enemy's forces in half but deprived him of a major base.

It was not long before the threat of serious interference by enemy surface craft could be regarded as relatively negligible, and it was soon possible increasingly to turn our attention to the attack of German coastal shipping. Our anti-shipping squadrons were accordingly re-deployed, the majority being directed to the attack of convoys off the southern coast of Norway and the coast between Germany and Belgium. Only one Beaufighter squadron was retained to share with the Swordfish and Albacores protective duties in the Channel area.

The Mosquito squadrons in the West were now being equipped with rocket projectors and they, in conjunction with a flight of Mosquitos armed with 6-pdr. cannon (a weapon originally intended and on a few occasions successfully used for the attack of U-boats), made numerous successful attacks against small convoys and minesweepers along the Biscay coast. During the month of July six merchant vessels and fifteen light naval craft were sunk and a further fourteen seriously damaged.

At the beginning of August the southerly advance of our land forces led to an attempt by the enemy coastal craft to seek the comparative safety of easterly ports, This, and the necessity to supply the beleaguered garrisons in the Biscay ports by sea. provided our anti-shipping forces with numerous targets. By the end of August, nine merchant vessels and twenty naval craft, including the two surviving destroyers in the Gironde, had been sunk. During the three-month period from D-day the anti-shipping squadrons sank eighteen merchant vessels and thirty naval craft and seriously damaged another thirty-six. For these losses the enemy received a small return. E-boats sank only four ships and damaged seven others, and mines accounted for eight ships sunk and fifteen damaged.

From now on we were able to turn our attention almost completely to enemy shipping off the Dutch, German and Norwegian coasts. Five squadrons—three Beaufighter and two Mosquito—were moved to Scottish bases under No. 18 Group, the remaining two Beaufighter squadrons being retained in Norfolk in the 16 Group area. In both these areas we returned to our tactics of attacking in large formations, and the success of these attacks soon compelled the enemy to move only by night and to lie up by day in protected harbours or isolated fjords.

In the 16 Group area it was found possible to attack the convoys as they formed up just before dark outside the harbours or as they entered harbour at first light. The second of these conditions meant despatching our aircraft in darkness when the maintenance of compact formations was not a practical proposition. This difficulty was met by using a Wellington aircraft to lay a circle of flares in the sea at a pre-arranged position. The attacking aircraft flew individually to this lighted position and circled the flares until it was just light enough to form into an effective striking force. The force then went in to the attack and on two occasions followed it up by attacking the shipping in nearby anchorages. By October these tactics had had the effect of stopping almost all movement of German shipping along the Dutch coast.

On the Norwegian coast, although there were some twilight attacks of the same type as I have just described, our main effort was concentrated upon the daylight attack on ships in the small land-locked anchorages where they were taking shelter. For these attacks aircraft known as " outriders " were used to lead the main formation to the target. The outriders were manned by Norwegian crews whose special knowledge of the area enabled them to fly ahead of the main striking force, find the target, and return to meet and guide the wing in to the attack. This often involved flights across land and snow-covered peaks and a diving attack with the rocket projectile on ships lying in narrow fjords surrounded by high mountains.

In all daylight attacks an essential element of the striking force was the provision of protection against enemy fighter attack. The distance of the targets on the Dutch coast made this a comparatively easy matter, but in the North it was only possible by the use of long-range Mustang aircraft. The need for this fighter protection in this area, where the enemy was well equipped with single-engined fighter squadrons, had for a long time been an urgent one, but it was only in the latter months of the War that these long-range Mustangs could be spared from other duties to provide this protection. In the days when no fighters were available our anti-shipping aircraft, which were no match for the enemy fighters, had to restrict their operations to conditions which provided low cloud cover. These conditions, although suitable for the attack of targets in the open sea, completely precluded that of shipping in the fjords owing to the height of the surrounding mountains. Once, however, the fighter protection was available, it was possible to attack shipping in all positions and in all conditions of weather.

Another method of attacking shipping at night was developed by two Halifax squadrons which had previously been used against the U-boats. These squadrons developed a technique of attacking by the light of flares after detecting their targets by radar. In the latter months of 1944 until the end of the War they came into their own as a result of the enemy's restriction to night movement. They were employed principally against shipping sailing in the Skagerrak and Kattegat—an area which was until almost the end of the War out of range to any of our principal anti-shipping squadrons. They made many successful attacks and caused considerable loss and damage to enemy shipping.

By December the offensive in the southern part of the North Sea had become restricted to action against light naval craft. It was by this time possible to make use of advanced bases in Belgium and patrols were designed to bottle up the enemy in the Hook and Ijmuiden areas. A large-scale operation against the defended anchorage of Den Helder in January caused serious damage to a merchant ship and five escort vessels, but this was an expensive attack in the face of the strong anti-aircraft shore defences, and cost us the loss of six aircraft and damage to eleven others.

In March a new type of target presented itself in the shape of the midget U-boat. This was a small and difficult target to find, but in spite of this fifteen of them were destroyed by Beaufighters and Swordfish, and it is possible that a further nine were destroyed.

In the North, as the tactics of attacking shipping in defended harbours and remote fjords developed, the scale and frequency of operations increased with improving weather and lengthening hours of daylight. By April the introduction of long-range drop tanks enabled us to supplement the night operations of the Halifax in the Kattegat by a daylight offensive by Mosquitos in this area. The result of all this anti-shipping activity, to which must be added the operations of our own submarines along the Norwegian coast, was that enemy sea communications were completely disorganized.

THE LAST PHASE

To return once more to the anti-U-boat operations, which you will remember we left at the point of complete evacuation of the Biscay ports, the situation had now completely changed. Apart from a short burst of activity at the end of September when U-boats returning to the Norwegian coast were imprudent enough to expose themselves to attack and suffer the loss of five boats and damage to two more, there was relatively little activity in the anti-U-boat war for the next few months. The enemy concentrated upon training his crews in the use of the new types of U-boat which were being completed in ever increasing numbers.

The loss of the Biscay ports had restored the situation of early 1940. Ths introduction of improved equipment to warn the U-boats of detection by aircraft radar and the increasing use of the *schnorkel* had to a great extent relieved the U-boate of the constant fear of air attack, but the limitations in speed and mobility imposed by the *schnorkel* made large-scale operations against Atlantic convoys impossible until the new U-boats with their greatly increased under-water speed could be brought into operation.

Operations by U-boats were, therefore, restricted to the use of the standard type of U-boat in patrol areas close inshore around the British Isles, special attention being paid to focal points of traffic. In these operations the *schnorkel* proved a valuable asset to the enemy, detection from the air either visually or by radar being a matter of extreme difficulty. There is, I think, no doubt that these operations were also designed to give practice to the U-boat crews in the use of this device. In its early days the *schnorkel* was most unpopular with the crews owing to the unpleasant conditions it produced in the boat. The long trek from the Biscay ports to Norway, however, and now the development of inshore operations enabled crews to develop a high degree of skill in its use until it became practicable for U-boats to operate submerged continuously for periods up to five or six weeks, and later up to ten or eleven weeks. The number of U-boats in inshore waters was gradually increased until by the end of February, 1945, thirteen were in position around our coasts. During the three months December to February, U-boats succeeded in torpedoing a total of 55 ships, 37 of which were in home coastal waters.

The location and attack of U-boats operating in this way greatly complicated the task of the aircraft, and the pendulum of counter-offensive swung to the naval surface forces equipped with under-water detecting apparatus. Even for them, however, the detection and attack of U-boats was no easy matter. The shallow and irregular sea bottoms in these inshore waters and the many false indications given on the detecting apparatus by the numerous wrecks in the area presented a new problem

which had not been met with in the deep ocean water where the U-boats had formerly operated. Nevertheless, 28 U-boats were sunk during this period, but only three of these were by Coastal Command aircraft.

This period also saw attacks by our Liberators on the training and exercising areas for newly commissioned U-boats around the island of Bornholm in the Western Baltic. These attacks were made at night and involved a round flight of 1,500 miles. Fourteen U-boats were attacked, and although none was sunk the enemy could no longer feel that his training areas were safe from air attack. Night patrols were also extended to the Skagerrak and Kattegat and The Belts.

It is, I think, clear that the enemy was at this time using the *schnorkel* more as a protective device than as an aid to offensive operations. More vigorously handled the *schnorkelling* U-boat could probably have inflicted heavier damage than it did; but once again, as we believe, the enemy was conserving his efforts for a new and, as he hoped, devastating attack as soon as his new U-boats came into commission. Once again this lull in U-boat operations was used by Coastal Command and the Navy for the purpose of intensive training in the use of radar and asdic detection of the *schnorkelling* U-boat operating in inshore waters. New devices were developed for the detection and attack by aircraft of U-boats moving under *schnorkel* conditions or totally submerged.

Whatever may or may not have been in the minds of those responsible in Germany for the conduct of the U-boat war during this period, their strategy and tactics took a form which was baffling enough to give us cause for serious concern. The introduction and skilful use of the *schnorkel* had made it possible for the U-boats to operate in waters and conditions in which they could never have dared to take the risk a year earlier. The potential danger to our shipping as it neared harbour was very great and could not be ignored.

We were accordingly forced on to a strictly defensive plan. At a time when the difficulties of detection and attack from the air called more than ever before for the co-operation of air and surface forces for offensive operations in the transit area between Norway and the Atlantic—where the problem of the surface hunting craft would, moreover, have been immeasurably easier than in the difficult inshore waters—we found it necessary to concentrate all the surface hunting groups around our shores, especially in the Irish Sea. These craft shepherded our convoys through the danger areas until they were safely in port or out into ocean waters. Liberal air co-operation was provided. If a U-boat gave away its position by torpedoing a ship it was immediately hunted by both surface and air forces, and often paid the penalty for its attack.

This policy achieved its purpose in preventing any serious drain on our shipping. But it strained our surface forces to the utmost to keep the situation in hand with only thirteen U-boats in patrol positions. If the enemy were to maintain up to thirty or forty U-boats around our coasts, which we felt he might well do, and if in addition he were to decide to deploy large forces, including the new fast underwater types, in mid-Atlantic from which our surface hunting groups had been withdrawn, we knew that the situation would be serious indeed. We did in fact have a taste of this policy before the end. By the end of April, in spite of heavy losses, there were signs of renewed vigour in the U-boat operations. At this time the number in inshore waters had increased to twenty. Five were in overseas positions, forty on passage—some in mid-Atlantic—and twenty in Arctic waters. Fortunately the new long-range fast types of U-boats never became operational owing to various teething troubles,

although forty were by this time in commission. The new short-range types did make their appearance off the East coast of Scotland in March, but there were only fifteen operational by the end of April.

During March and April, 44 ships were torpedoed—a larger number than we had become accustomed to over a comparable period for many months. But the U-boat sinkings increased in proportion: 45 were sunk—15 by Coastal Command aircraft, the other 30 by surface forces. The increase in air sinkings was due largely to the opening of daylight as well as night attacks against U-boats on passage between Norway and the main German Baltic submarine bases. The daylight element of this offensive was launched by the Mosquito and Beaufighter anti-shipping wings armed with rockets, and accounted for four U-boats. But the high proportion of surface to air sinkings showed clearly the vital importance of maintaining really big numbers of surface hunting craft. There is little doubt that had it been possible to operate these craft offensively in strength, in co-operation with aircraft, in the transit area, as well as defensively in the inshore waters, the number of U-boat sinkings would have been very much higher.

Most valuable support was given during March and April by the heavy bombers of Bomber Command and the United States Eighth Air Force who in attacks on the principal U-boat bases and building yards destroyed a further 36 boats. But in spite of these losses the number of U-boats on patrol increased right up to 4th May, when there were over seventy at sea, of which twenty were in inshore areas. Six ships were torpedoed in May, and there was every indication that the U-boat was still very much alive.

Then came the last mad week. Just as the advance of our armies in France had forced the U-boats out of the Biscay ports, so now again, in conjunction with the Russian armies from the East, they repeated the performance in clearing the Baltic bases and training grounds. The U-boats bolted for Norway in headlong flight through waters mostly too shallow to allow of prolonged *schnorkelling*. This and the precipitate urge to escape combined to produce the old daytime surface tactics. Coastal Command aircraft of all types were joined by aircraft of the Second Tactical Air Force in a veritable holocaust of destruction, in which twenty U-boats were destroyed—fifteen by Coastal Command and five by the 2nd T.A.F., before the capitulation of Germany called a halt to their operations on 8th May.

The anti-shipping squadrons indulged themselves in a similar orgy of destructive attacks. Operating from Scotland and from advanced bases on the Continent, they converged on the shipping in the Belts and the Kattegat, and in these last weeks of the War sank 69 enemy merchant vessels and light naval craft.

RESULTS AND REFLECTIONS

During the whole period from mid-May, 1944, till the end of the War, 66 U-boats were sunk outright by Coastal Command aircraft and nine in co-operation with naval surface craft, while 65 were sunk by naval forces alone; 39 more were damaged by Coastal Command. In all 124 anti-U-boat aircraft were lost.

In the same period 89 merchant vessels, totalling some 220,000 tons, and 90 naval craft of all types were sunk by the anti-shipping aircraft. A further 95 merchant ships and naval craft were seriously damaged. For these successes we paid the price of 224 losses in anti-shipping and reconnaissance aircraft.

I have tried to tell the story of Coastal Command's contribution to the victorious conclusion to 5½ years of war. However inadequately I have told it, I think it may be claimed that it is one more story of good co-operation.

First and last, we can look back with pride on the performance of the aircrews—on the magnificent teamwork amongst the members of individual crews in the anti-U-boat aircraft where each man had his own special part to play in the complicated and hazardous business of search, shadowing and attack, sometimes in isolation, sometimes in concert with surface forces or other aircraft, and more often than not in the foulest of foul weather. Then there was the slow but sure development of the combined anti-shipping wing tactics where the handling of large formations almost at sea level in the attack of heavily defended convoys called for the highest degree of leadership, courage, and skill in combined manœuvre; then again the co-operation of the Wellington reconnaissance aircraft in directing air and surface forces to the attack of small fast moving targets at night.

Next we must remember the whole-hearted support given by the maintenance men on the ground to their aircrew colleagues. Coastal Command was no exception to the general condition of shortage of manpower at that time, and it owes much to the unremitting labour of the men who were prepared to, and did, work round the clock to keep the squadrons in the air.

Then came the planning and technical staffs who joined hands with the scientists in developing the tactics, weapons and equipment of the anti-U-boat and anti-shipping squadrons.

Behind the operational staffs were the administrators, upon whose uncomplaining efficiency the former relied, with well-placed confidence, for the flexibility of movement and supply without which their plans would have come to nought. And further up still we had the unfailing understanding and support of the Air Ministry staffs who, though hard pressed by urgent demands from all sources, always somehow seemed able to produce " out of the bag " what we needed.

To Bomber Command and the American 8th Air Force we owe the co-operation provided by the brilliant attacks on U-boat and shipping bases, and to the Allied Expeditionary Air Forces and the Air Defences of Great Britain the protection afforded to our anti-U-boat and anti-shipping aircraft. All this support was given in the face of heavy demands of a different nature in furtherance of the main object.

Time has compelled me to restrict my remarks to the activities of the squadrons strictly engaged in air/sea warfare, but we must not forget the work of the Air/sea Rescue, Meteorological and Photographic Reconnaissance squadrons, all of which operated under Coastal Command and served the general needs of air, sea and land forces alike.

But perhaps the most noteworthy example of co-operation was that which existed between Coastal Command, the Admiralty, and the Naval Commanders-in-Chief. I do not say that we always agreed—indeed, how dull it would have been if we had! But we were honest with each other, and out of this atmosphere sprang a mutual confidence which was as sure a guarantee towards producing the right answer as any I can think of.

This close co-operation between the Navy and ourselves had of course existed and developed throughout the War. In the U-boat war particularly it was interesting to see how at one time or another either naval or air forces appeared as the more potent weapon. For example, we in Coastal Command may justly claim that in the year 1943 the aircraft became the chief and most dangerous enemy of the U-boat. We may indeed regard the introduction of the *schnorkel* as a compliment to the effectiveness of aircraft as an anti-U-boat weapon, because it was undoubtedly born of the fear of air attack. But, once introduced and operationally effective, it severely

cramped the aircraft's style, and the surface hunting craft became the principal killer, just as it had been at the beginning of the War before the problems of air search and attack had been properly developed. But this did not mean that the aircraft was put out of business. It still had the power to make an initial sighting and often an attack; but for the follow-up and attack of the *schnorkelling* U-boat it needed the co-operation of surface craft, just as the surface craft needed the assistance of the air for purposes of detection and direction to the scene of action. So back we come to the constant need for co-operation between air and surface forces and to the general conclusion that the control of sea communications is now a combined job for the Navy and the Air Force—a job in which first one and then the other may for the time being take the leading role, but in which both are complementary and indivisible.

It has often been suggested that the U-boat that we knew in the War was rather a "submersible destroyer" than a true submarine. In the new types which, as I have said, never came into operation, the Germans hoped and believed that they had produced the true submarine. And they confidently regarded it as a war winner, but they were too late to put it to the test.

We must frankly admit, however, that the U-boat menace was never defeated. In the last week of the War, even though the enemy was still using the old standard types of U-boat, the freedom of movement endowed by the *schnorkel* enabled him to maintain a steadily increasing total of U-boats at sea and more in inshore patrol areas than ever before. We had, therefore, good reason to believe that with the introduction of the new types we were to be faced with a serious recrudescence of intensive U-boat warfare which it would have needed all our ingenuity and determination to defeat. I do not doubt that we should have come through it. We were not without ideas; in fact, we already had practical proof of the success of certain new devices and tactics which were under active development. But it would have been a hard struggle.

So I come to the last illustration of co-operation and team-work on the grand scale. It was in the end our armies which put the seal on the U-boat war in common with all other enemy activities. They in turn will be the first to admit that, without the work of the Navy and Coastal Command in the long drawn-out and tedious business of piling up in this island the men and material that the armies needed and, secondly, in launching them upon their great adventure on the Normandy beaches, they would never have been able to strike the final blow in the greatest combined operation in the history of war.

All this only goes to show how the operations of all arms, whether they belong to different Services or whether they be different components of one Service, are inextricably bound up with one another, and how essential it is to temper the natural and healthy competition between them by a full and balanced understanding of their inter-dependence.

Finally, we should do well to remember that the control of sea communications is still a vital ingredient in the life of our nation and Empire and in our success in war. Our methods of securing it may have changed, as indeed they have, and may change again, but, whatever the future may hold, we have not yet reached the stage when we can dispense with it or when our enemies can afford to ignore it.

THE CHAIRMAN

I am not in the least surprised to find you have no questions to ask the Lecturer because he has undoubtedly given us a wonderfully comprehensive survey. He has not only dealt with the Invasion, but he has given us a very good insight into the later stages of the Battle of the Atlantic.

With regard to that battle, I would remind you of what the Lecturer said at the outset, namely, that the work of Coastal Command had to be kept very much on the secret list, and the public knew very little of what was being done by it. All I shall say about this is that I think I am right in saying that, until the decision was made to increase Coastal Command and to give them more four-engined aircraft, we were losing the Battle. It was only when they got these aircraft that Coastal Command, working in conjunction with naval squadrons, were able to master the U-boat.

As to the Invasion, I was particularly interested to hear the Lecturer's remarks, because I had the privilege of serving at Portsmouth at that time and my responsibility was the safe conduct of all our forces, American and British, across the Channel or through the " Spout." Literally hundreds of ships, hundreds of thousands of men and tons of material poured through that " Spout," so I was naturally very interested in the method adopted for sealing the Western Approaches to the Channel. At that time we were rather anxious because we knew how great was the task of Coastal Command in dealing with U-boats ; the Admiralty spared very few hunting groups to operate in the Channel. We thought if a U-boat did find its way in we should have great difficulty in dealing with it because, with hundreds of vessels working in such a small area, it was difficult for anti-submarine craft or aircraft to tell which was a U-boat and which was an escort vessel or a merchant ship. Therefore we were very relieved to know that the " Cork " was proving effective. As far as I know, only one or two of the normal U-boats got through, but after that the *schnorkel* type was put into service, and it is a great tribute to Coastal Command that the enemy found himself limited to that type of submarine warfare in the Channel. From our Intelligence we knew that those submarines had arrived, but the first time we actually felt their presence was through a serious loss at Cherbourg where a troop transport was sunk.

Our crossings of the Channel from D-day had up to this time taken place both by day and by night. It was impossible at first to do anything but work the whole twenty-four hours because of the great volume of traffic which had to go through in order to make the operation a success ; but after the torpedoing of this transport, about a month after D-day, I believe, I decided that we would only operate by night, as I did not think the U-boats would do much damage by periscope action at night. This action scotched the operation of the *schnorkel* in those particular circumstances. We had several ships hit in the propellers by special torpedoes attracted by propeller waves, but not sunk.

The Lecturer stressed very strongly the need for co-operation, and I think every Lecturer we have had here has come to the same conclusion. It is, of course, common sense and always will be. Up to the time of the Invasion we did not have a great deal of co-operation with Coastal Command at Portsmouth ; we were principally involved with Fighter Command ; but when eventually we co-operated we got on very well together.

It now only remains for me to thank Air Vice-Marshal Ellwood on your behalf for the immense trouble which he has taken in preparing and delivering this lecture.

The vote of thanks was carried with acclamation.

NOTE.—An album of fine operational photographs, presented by Headquarters Coastal Command, can be seen in the R.U.S.I. library.—EDITOR.

FIVE CLASSIC CRUISERS

By Bernard Stokes

FOUR celebrated cruisers, their names as classic as their achievements, are leaving the Royal Navy. The "Leander," "Ajax" and "Achilles" have been earmarked for the Royal Indian Navy[1], and the "Orion" is being purchased by the Netherlands. A fifth sister—the "Neptune," was a war casualty.

Sixteen years ago these ships represented the apex of light cruiser design. Subsequent scientific development has outclassed them, but like many other "obsolete" ships their war service was invaluable and some of their principal exploits should not pass unrecorded.

H.M.S. "Leander"—the name ship of the class, was launched at Devonport on 24th September, 1931, and completed on 23rd March, 1933. The main features of her construction apply generally to her four sisters. She displaced 7,270 tons; her length was 554½ feet; beam 55 feet 2 in.; and draught 16 feet. Originally she mounted eight 6-in. guns in four turrets, four 4-in. A.A. (later increased to eight) in twin mountings, and a number of smaller A.A. weapons which multiplied considerably during the War; she also carried eight 21-in. torpedo tubes. Parsons geared turbines of 72,000 h.p. with four screws gave her a maximum speed of 32.5 knots. She carried 1,800 tons of oil fuel and a crew of 570. For protection she relied on 2-4 in. side armour amidships, a 2-in. deck, and bridge and turrets of 1-in. plating.

The neat and balanced profile of these ships found favour, but other novel features of their design did not escape criticism. A single stream-lined funnel combining all uptakes provided deck space for aircraft stowage and a catapult, later removed; but the consequent grouping of all boilers into one compartment amidships invited vital damage from a single hit. Their twin 6-in. turrets, reappearing after some thirty years, recalled the complications and uncertainties experienced in the early "Counties," despite the spaciousness and high elevation they afforded the new "auto-frettage" type of guns.

On trials, the "Leander" proved to be very wet, and it was therefore decided to carry the forecastle plating farther aft and to raise the boat stowage a deck in all the class. But the chief criticism was that, for £1,668,000, the "Leanders" compared badly with their foreign contemporaries: the Italian "Luigi Cadorna" class mounted eight 6-in. guns on 5,000 tons and had a speed of 37 knots; the U.S. "Memphis" class, displacing 7,000 tons, carried twelve 6-in. guns with a speed of 34 knots; while the Japanese "Kakos," also of 7,000 tons, mounted six 8-in. guns and equalled the speed of the American ships. The "Leanders" seemed slow and undergunned; but in action they have shown up better than might have been expected from paper figures.

H.M.S. "Leander"

The "Leander" served with the Home Fleet until 1937 and then with the New Zealand Division. After escorting convoys in the East Indies during October, 1940, she shelled Mogadiscio—the capital of Italian Somaliland, on 29th November.

In 1941 she was raider-hunting in the Indian Ocean and intercepted the 3,667-ton armed Italian auxiliary "Ramb I," flying the Red Ensign. When challenged that ship hoisted Italian colours and opened fire with 4.7-in. guns. Five salvoes from the British cruiser, however, set her on fire; she struck her colours and sank an hour

[1] It is now doubtful whether this project will materialize.—Editor.

later. On 4th March the "Leander" captured two supply ships intended for a German raider which had already been sunk by H.M.S. "Cornwall"; one was the German tanker "Coburg" and the other the Norwegian tanker "Ketty Brövig," captured and used by the enemy.

When the dangerous Iraqi revolt flared up in April she moved up to Basra with other ships to restore the situation. She supported the Army in the Syrian campaign, and on 14th June vainly chased two elusive Vichy destroyers from Sidon well to the North of Beirut. She escaped the persistent attentions of German bombers, and the following month was taking troops to Cyprus.

January, 1942, found her beginning a long period of service with the Anzac Force. In July, 1943, she was torpedoed in Kula Gulf in the Solomons, but survived her injuries.

H.M.S. "Achilles"

The "Achilles" was completed by Cammell Laird on 10th October, 1933. After serving with the Home Fleet until 1936 and then with the New Zealand Division she joined the South American division under Commodore Harwood early in the War, and with that force won lasting fame at the Battle of the Plate.

The "Graf Spee" was sighted at 6.16 a.m. on 13th December, 1939, and the "Achilles," with her sister ship, the "Ajax," moved off to the North-East, closing the enemy and working up from 14 to 28 knots in twenty minutes—normally a two-hour process. At 6.18 she came under 11-in. shell fire and quickly replied with effect. Drawing the enemy's fire from the battered "Exeter," the two light cruisers, by 6.40 a.m., turned the battle into a chase. An 11-in. shell burst just ahead of the "Achilles" and flying splinters wounded Captain Parry, the Gunnery Officer, and a yeoman of signals, and killed three men in the main control position, thereby interrupting fire control until the secondary position took over. Throughout forty minutes fierce fighting the range closed as the "Achilles" and "Ajax" dashed through their own and the German smoke screens to score damaging hits at only 8,000 yards. Breaking off action at 7.40 a.m. for fear of ammunition shortage, the two cruisers shadowed the enemy relentlessly all day.

Twice during daylight and three times after dark the "Graf Spee" tried to drive the "Achilles" off, but the British cruiser hung on until the enemy took refuge in the neutral port of Montevideo. There she waited four days for the German armoured ship to emerge, only to witness the "Graf Spee's" ignominious suicide. When she fought at the Battle of the Plate the "Achilles" had steamed 124,000 miles since her last refit. On 22nd February, 1940, she received a tumultuous welcome at Auckland, New Zealand.

In January, 1942, she joined the Anzac Force, and a year later was damaged by a Japanese dive bomber at the bombardment of Munda, in the Solomons. She was in Admiral Fraser's Pacific Fleet at the surrender of Japan.

H.M.S. "Orion"

The "Orion," another Devonport ship, entered service on 16th January, 1934, and worked with the Home Fleet until 1937 when she joined the America and West Indies Station, but her war service was mainly in the Mediterranean. She carried the ashes of Lord Tweedsmuir from Canada to England and escorted the first R.C.A.F. squadron before taking part in Admiral Cunningham's first sweep against the Italians on 11th June, 1940. On the 21st she bombarded Bardia, and on the 28th was in action, in company with the "Neptune" and the "Sydney," off Cape Matapan against three Italian destroyers, when the 1,073-ton "Espero" was sunk. She wore

Vice-Admiral Tovey's flag in the convoy operations which culminated in the Battle of Calabria in July. After much futile high-level bombing, the "Orion" and her cruiser squadron were threatened by two Italian battleships and six heavy cruisers, but supported by our battleships they chased a superior enemy home.

On 4th September she shelled Pegadia harbour and airport on the Island of Scarpanto, and in October bombarded Maltezana and towed the cruiser "Liverpool" to Alexandria after the latter had been torpedoed by enemy aircraft. During the celebrated Fleet Air Arm attack on Taranto, the "Orion" (Vice-Admiral Pridham-Wippell) led the light forces against Italy's Albanian convoy routes and sank three merchantmen in the Straits of Otranto. Later, in November, she covered troop convoys to Crete.

Before the Battle of Matapan, H.M.S. "Orion," on 28th March, 1941, led the light forces from the Piræus to a point South of Gavdo Island, and enticed an Italian cruiser force, which quickly straddled her, towards our battle fleet. At 8.55 a.m. the enemy reversed his course, and was followed by Admiral Pridham-Wippell, until the latter encountered heavy fire from the Italian battleship "Vittorio Veneto." For ten minutes 15-in. shells fell round the "Orion," whose decks were drenched with splashes and upperworks damaged by splinters. A successful attack by Swordfish aircraft on the battleship eased the pressure and ill-fortune robbed the light forces of a night attack.

The hazardous evacuation of Greece was directed from the "Orion," who herself rescued troops from the Gulf of Nauplia.

In the desperate defence and evacuation of Crete the "Orion," under Rear-Admiral Glennie, searched for invaders off Southern Greece and was bombed for seven hours on 21st May. That night she and her consorts met a German invasion convoy North of Crete. Ramming and intense gun-fire of every kind annihilated over 4,000 troops.

On 28th May Rear-Admiral Rawlings hoisted his flag in the "Orion" to conduct the Heraklion evacuation. A series of mishaps found the force, loaded with troops, 25 miles from Scarpanto airfield at 6 a.m. next morning when a 7-hour bombing attack began. During that time a heavy bomb wrecked the "Orion's" "A" and "B" turrets, causing heavy damage and casualties, and another passed through the bridge to make havoc on the crowded mess-decks. With her bridge wrecked, engines and steering gear damaged, her Captain, First Lieutenant and three engineer officers dead, and with a heavy list, she reached Alexandria with only two rounds of 6-in. ammunition and ten tons of oil fuel left. After extensive repairs she was back in service again and, at the end of 1942, was covering Mediterranean convoys.

As a bombarding ship the "Orion" achieved exceptional fame and provided covering fire and engaged shore targets at Pantellaria, Sicily, Salerno and Anzio. During the Normandy landing she earned the Army's special thanks. She was similarly employed in the operations in Southern France and the liberation of Greece.

H.M.S. "Neptune"

The "Neptune" was launched at Portsmouth on 1st February, 1933, and completed on 22nd February, 1934. Early in the War she served in the South Atlantic with the "Ajax," "Exeter" and "Cumberland," and was operating off Freetown during the Battle of the Plate. She shelled Bardia with the "Orion" in June, 1940, and signalled "Enemy battle fleet in sight" at the Battle of Calabria—the first time that signal had been made in the Mediterranean since the Napoleonic Wars. Later in July she covered Ægean convoys. In the Summer of 1941 she took

troops to Cyprus and intercepted the German ship " Gonzenheim," which scuttled herself and was finally despatched by the British cruiser.

From December, 1941, she was with the 7th Cruiser Squadron which, with the 15th Cruiser Squadron, held the Mediterranean against the threat of Italy's battle fleet. As part of Malta's Force " K " she fought in the desperate convoy operations until, leading the Force against an enemy convoy on 19th December, 1941, she struck an uncharted minefield and, helpless, struck two more mines. The destroyer " Kandahar " was mined going to her assistance, and Captain R. C. O'Conor signalled: " Keep away " to Force " K." Soon she hit a fourth mine and slowly sank before consorts, powerless to help.

H.M.S. " Ajax "

H.M.S. " Ajax," completed by Vickers-Armstrong on 3rd June, 1935, and serving on the America and West Indies Station, wore Commodore Harwood's flag at the Battle of the Plate, and fought as brilliantly as the " Achilles." An 11-in. shell disabled her two after turrets and an accident silenced one forward 6-in. gun, but she pressed home her attack. While in hot action she had catapulted her seaplane which did valuable spotting for the guns of both cruisers and was up for two and a half hours.

She escorted a troop convoy to Aden in September, 1940. Returning from Malta on the night of 11th–12th October she engaged two enemy destroyers at close range; one blew up and the other was left blazing. A third was sighted and also blown up. She took British troops to Crete in October, fought with the Otranto Straits raiding force on the night of Taranto and took Greek troops to Crete. She fought in company with the " Orion " at the Battle of Matapan and rescued troops from Rafina, Raftis and Monemvasia during the evacuation of Greece.

On 8th May, 1941, she fired star shell in support of a night bombardment of Benghazi by a force of destroyers to divert attention from an important British convoy. She was damaged by near misses from German aircraft during the operations off Crete, but shared Admiral Glennie's destruction of the invading force and emerged with the remains of a wooden caique draped across her bows, which threw up a colossal bow wave. On passage to evacuate Heraklion she sustained damage and casualties from a near miss and had to put back.

She fought in the early stages of the Syrian campaign and, after being relieved by the " Leander ", returned on 3rd July, wearing the flag of Rear-Admiral Rawlings, and shared in a tremendous bombardment of Damur in support of the Army. In October, 1941, she shelled a battery near Tobruk, served with Force " K " in November, and bombarded Bardia at the end of December. She wore Admiral Rawlings' flag in the dark days of December, 1941, to April, 1942.

She also took part in the Mediterranean landings and was damaged by bombing at Bone in January, 1943. Off Normandy she fired 114 rounds at the Longues battery of four 155-mm. guns in reinforced concrete casemates, destroying two out of four guns and damaging a third—a remarkable exhibition by a ship against a shore battery. She later played a part in the liberation of Greece.

More recently the " Ajax," " Achilles " and " Leander " have had " X " turret removed and replaced by twin 40-mm. Bofors A.A. guns to compensate for the extra weight of radar equipment and A.A. guns and ammunition.

These are but the bare outlines of the adventures and achievements of these gallant little ships; but they will serve to leave on record five names which history will accord a high place in the annals of the Royal Navy.

STANDARDIZATION

By Lieut.-Colonel J. V. Davidson-Houston, M.B.E.

IT is the present fashion to talk of standardization as a desirable object, but few people are agreed on the exact meaning of the word, still less upon its implications. The Oxford Dictionary gives the following definitions: "*Standard*—Weight or measure to which others conform, or by which the accuracy of others is judged; thing serving as a basis of comparison; degree of excellence for a particular purpose; average quality." "*Standardize*—Make to conform to standard."

A standard, strictly speaking, must therefore be unique, and all things based upon it must conform exactly to it. It follows that a standard piece of equipment, to take a practical instance, must be composed of standard components. True standardization thus implies standardizing such elements of production as screw-threads, tolerances and engineering drawing practice itself.

The advantages of such a process from the Service point of view are, broadly:—

(*a*) Easing the problems and costs of production and provision by concentrating effort upon the minimum number of types consistent with operational needs, thus simplifying expansion for war.

(*b*) Facilitating supply in war, by enabling co-ordinated production to be carried on by a large number of factories, both in the United Kingdom and throughout the Empire. Inter-allied standardization would extend these advantages still further, while standardization on a world basis would confer the double-edged benefit of being able to use enemy equipment.

(*c*) Maintenance and training would be simplified, leading indirectly to economy in manpower, and lessening the load on the Lines of Communications in time of war.

Basic Standardization

The difficulties of true standardization are, however, no less real, for its consummation depends upon the basic industries of the countries concerned. It is not always to the advantage of rival national industries to pool their development resources and information, and we may be sure that no fundamental changes in engineering practice would be accepted unless their peace-time benefits were demonstrated. Typical examples in the international sphere are differences over the use of the Metric System, and the variety of screwthread pitches employed by Great Britain and the United States. Commercial rivalry ensures that, even in a country's trade associations, firms draw together only when conditions are bad; moreover, in normal times the requirements of the Services are generally too small to influence civil practice. Nothing short of complete nationalization could enforce industrial standardization.

Harmonization

There are three ways, however, by which an approach may be made towards standardization, through what may be termed harmonization. In the case of weapons or stores which have a purely military use, *specifications* are drawn up by the Services, and the only form of standardization called for is between the Services themselves. There is, however, a vast number of stores of commercial type which are required by the Services, such as electric lamps or road-making machinery. In this case the Services cannot expect industry to produce exclusive types to their design, especially as peace-time finance would reduce orders to a minimum, and the most that can be done is by *rationalization*. That is to say, the Services determine

their qualitative requirements and then select a suitable range from commercial production which will cover these requirements. This will achieve the object of reducing the number of types used in the Service. A third method is *inter-changeability*. It is obviously an advantage if a store, although not identical with the corresponding item in a Dominion or Allied Service, can be used in substitution for it. Interchangeability of ammunition would be a valuable asset in the field of weapons, while in the late war lists were compiled to show the correspondence between British and American hand-tools and wireless components. This method involves the compilation of inter-Service catalogues, cross-referencing of vocabulary numbers, or the making of interchangeability lists.

Sequence of Processes

Several stages are necessary in achieving any degree of standardization in the Services. The first is the rationalization of types, which under present conditions will usually mean the selection of a limited range from existing types during the interim period before new designs can be developed. The next is the formulation of "user qualitative requirements" by the Service concerned, giving the desired performance. At this stage standardization passes out of the hands of the Service staffs into those of the procurement authorities in the Admiralty or Ministry of Supply, who, on the basis of the user requirement, undertake design, development and production.

Standardization within a Service

It is obvious that any standardization or rationalization must begin in the user Service concerned. Within the Army, for instance, there are similar stores provided by both the Engineers and the Ordnance Service, and the first step is to rationalize both the provision responsibility and the ranges of such stores. In the field of weapons, General Staff policy must be clear before a minimum range of tracked vehicles (tanks, A.V.R.E., carriers) or of guns (anti-aircraft, coast defence and field roles) can be acted upon by the designers.

Inter-Service Standardization

When we come to inter-Service standardization we encounter new difficulties. Even in the case of weapons, where similarity of use may lead to the adoption of the same type by more than one Service, it is found that modifications are liable to be introduced by the various users, so that the drawings on which the designs are based are gradually differentiated; and without ruling drawings there cannot be true standardization. In the case of non-weapons the problem is still more difficult, unless all are prepared to accept the types (e.g., blankets) of the major-user Service.

If, for example, it were desired to specify standard ranges of stationary internal combustion engines, the task of agreeing upon a minimum number of strokes and bores would be complicated by the fuel situation, one Service insisting upon compression-ignition types with their less inflammable fuels, and another advocating petrol engines. Furthermore, the Admiralty has its own production department, while the Ministry of Supply undertakes the production of Army and Air Force requirements.

Parallel with harmonization of the user requirements, therefore, there should be an inter-departmental organization to translate these requirements into standard specifications, and to decide in each case which production agency should undertake the development of the store in question. Such an organization must be in close touch

with the user machinery at all stages, in order to avoid wasteful effort on the part both of the staffs and of the designers.

Imperial Standardization

The next step is obviously standardization between the nations of the Commonwealth. This raises few difficulties as regards weapons, since their design depends mainly upon agreement between United Kingdom and Dominion staffs, while production can, if desired, be dispersed through action by the Governments concerned.

It is in the sphere of stores which are required to meet local conditions or have also a civilian use that special machinery will be necessary; Australia, for example, has in the past developed tropical clothing to specifications differing from those of India. In some cases it may be possible to achieve standardization or interchangeability; in others local peculiarities may preclude either. But it is clearly desirable that some organization should exist whereby representatives of the Commonwealth nations, both on the staff and production sides, should be able continuously to exchange views and recommend to their home authorities the greatest possible degree of standardization or harmonization.

The question here is whether each Service should seek to standardize on a Commonwealth basis before the inter-Service aspect is tackled; or whether each Empire country should first achieve its own inter-Service standardization. Since the defensive arrangements of the Dominions are the exclusive responsibility of their own Governments, and each possesses its own Defence Ministry or other machinery for co-ordinating Service requirements and production, the latter method is at present the only practicable one, and in each Empire country there should be organizations analagous to the above-mentioned staff and production bodies in the United Kingdom. It would then be possible, by means of Commonwealth committees, to formulate common staff requirements, to pool research and development resources, and to rationalize production among the members of the Commonwealth.

International Standardization

The last and most difficult problem is standardization among the United Nations, with a view to common military action. The nearest approach that has been made to this is the co-operation between the United States and ourselves during the late war, where some weapons were adopted by the forces of both nations and where interchangeability was achieved as regards certain stores. Further than this it has not yet been possible to go, chiefly because basic standardization depends upon the industries of the two countries, who are naturally loth (particularly in America) to forego their competitive methods or to abandon their accustomed standards and practices for the sake of problematical co-operation in war.

The problems of standardization between the forces of the United Nations generally, or even between those of the four Great Powers, are still more formidable. Apart from the difficulties in reconciling the engineering standards of countries tied respectively to the Metric and the English systems, staff requirements depend to a great extent upon tactical doctrine, the standardization of which would be subject to very far-reaching considerations. In the present state of international relations, the necessary pooling of information must be regarded as Utopian, in addition to the fact that the Military Staff Committee has been unable to decide on the form of campaigns which the United Nations may be called upon to undertake, or who the enemy might be.

Under existing conditions, in fact, one's imagination might conjure up visions of a war in which standardization would enable the combatants to be equipped with and trained in the use of each other's weapons, like the two sides in an exercise!

Conclusions

Standardization and harmonization cannot be treated independently of one another, and their achievement must be a matter of wise compromise and gradual growth. Basic standardization has already made some progress in this country, and in many spheres it is essential to the economy of force by which alone Great Britain can "make both ends meet." Conferences have proceeded for many years with a view to achieving similar engineering standards between this country, Canada and the United States, but progress is likely to be slow. Any wider international standardization belongs to the future. Harmonization of Service requirements is feasible, and the measures already taken under the impetus of the late war are being widened and improved upon in view of the necessity to rationalize the needs of the Services together with those of industry in this country and throughout the Empire.

AIRCRAFT PRODUCTION FOR WAR

By Group-Captain G. W. Williamson, O.B.E., M.C.

SOME historian of the future is going to have an interesting time compiling a book on the subject of aircraft production for war. Among the documents to which he will turn will undoubtedly be an official publication entitled *The Aircraft Builders*[1], while opposing evidence will be found in Sir Arthur Harris' *Bomber Offensive*. A good account of the slow development of the Royal Air Force between the wars appears in *Per Ardua*, by H. St. G. Saunders; while *The Sky's the Limit*, by David Farrer, provides a light-hearted story of what the Ministry of Aircraft Production was like in the great days of Lord Beaverbrook.

None of these books, however, touches even lightly on the all-important subject of preparation for war. Deductions as to better methods than those adopted will have to be drawn from other literature on this and related subjects. The question which the historian will have to consider is "Was aircraft supply adequate during the last two great wars, and if not, what steps should be taken to make it so in case we may have to fight another?"

Royal Air Force officers, especially those with experience of supply, either as producer or consumer, in both wars, are well aware that our needs were not met by a Ministry of Munitions in 1917-18, or by a Ministry of Aircraft Production from 1941 onwards. Prior to these dates, they could not expect a supply of aircraft adequate in design, equipment, and numbers because adequate foundations had not been laid. In both wars aircraft production followed the same course:—

(1) Before war began there was an earnest searching after quality. This was right; but little regard was had to the need for production. Thus, good quality German magnetos were still being purchased when war broke out in 1914; again, in 1939, materials, instruments, the repair of aircraft and engines, installation of equipment and the delivery and collection of aircraft had not been well organized.

(2) In the second stage we find that the Service staffs and the Civil Service, though effective enough in peace-time, were totally inadequate in war. In both wars they lacked organizing experience and technical knowledge, and had little or no regular contact with industry.

(3) In both wars, a National Government appointed some giant of industry to clear up the resulting mess, which usually led to his inviting experts of his own choice to take charge of various Departments. From the 1914-18 War, the names of Lord Cowdray and the then Sir William Weir remain in the memory. Expansion in the 1939-45 War began to move with the appointment of Lord Beaverbrook, whose work was based upon the firm foundation laid over many years by Lord Dowding.

(4) In each war, after about a year of intense activity, the Minister went elsewhere; then the clerical and administrative machinery grew too big for the remaining industrial experts, and production became inadequate.

At the end of the 1914-18 War, the enormous staffs of Defence Ministries and the Civil Service were soon dissipated, with the exception of those retained for the disposal of military equipment. After the late war, an immense Civil Service still remains to control peace-time industry by discredited war-time methods.

[1] *The Aircraft Builders*, H.M.S.O. 1947. 9d.

It is remarkable to find that exactly the same incubus exists in the United States. In the American phrase, " The clerks have captured the Government."

Inexperienced Staffs

The Prime Minister has recently said that the British Civil Service is the best in the world, and that is true ; the next best is probably the American. But both suffer from the defect of any civil service, however good in time of peace, that it is not the best instrument with which to prepare for a war involving what has been called " a contest of material." Lord Elton says :

> " Our bureaucracy is uncorrupt, industrious, conscientious and, within wide limits, impartial. It contains a high proportion of the sort of ability which can be detected by written examinations. On the whole, at a time when we need supremely competent administration, its members are no longer of adequate ability. They are administrators who have never been administered and too seldom make direct contact with the problems they handle. There is no advanced specialized training in the modern techniques of organization and management, on the analogy of the Imperial Defence College. In the future, radical changes will be needed in the selection and organization of the service."[2]

More directly applicable to the subject under discussion are Mr. Winston Churchill's remarks when, on 28th April, 1938, he said :

> " Aircraft manufacturers cannot help being irritated by inefficiencies in the Contract and Design Departments of the Air Ministry. No broad layout was made at the beginning of the expansion ; orders were given and are given piecemeal, in little packets ; they have never been able to prepare their Works for mass production ; designs are rapidly altered to the delay of production, and very often there is a gaping void between the execution of one contract and the assignment of another."[3]

In 1942, a Select Committee reported upon the organization and control of the Civil Service. The following phrases may be quoted :

> " In the period between the two wars, the response of the Treasury to the demand that expert knowledge and study should be brought to bear on the problems of departmental organization was meagre in the extreme. The outbreak of war was marked by the immediate spread of Government activity into the fields of production and trade on the largest scale. In some instances Departments asked for expert help ; in others, the Treasury themselves indicated fields of inquiry in which the introduction of modern technique might be of special value ; in others again, little or nothing was done. On one occasion a team of Treasury officers were ' bundled out ' of the Department in which they had started work." [4]

On a later page, the Report again refers to the fact that the years between the wars were largely wasted, and wise and far-sighted recommendations entirely ignored. Referring to the re-armament period from 1936-39, the Report says :

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[2] *St. George or the Dragon*, pp. 143-145. See also *Central Planning and Control in War and Peace* by Sir Oliver Franks, K.C.B.

[3] *Step by Step*, by Winston S. Churchill, p. 236.

[4] *Sixteenth Report from the Select Committee on National Expenditure, Session* 1941-1942 (*H.M.S.O. reprint* 1945), *paras.* 56-58.

> " When the threat of war was insistent, there was no overt sign that the Treasury or the Departments accepted the proposition that the organization of administrative machinery was a subject requiring expert and specialized study or that any lessons in the art of management could be learned from industry and commerce either in this country or abroad. . . . There was no body of expert knowledge which might have been built up if the ' systematic and periodical overhaul of the whole of the machinery of government ' had been undertaken." [5]

The conclusion we may draw from some of the foregoing evidence is that special staffs will be necessary well in advance of the beginning of another war.

Good Features of the Expansion

In both wars, the tide turned as soon as someone with high industrial qualifications brought specialized experience and dynamic energy to bear upon the mass of undigested problems facing the inexpert pre-war staffs. When Lord Cowdray took up his task in 1917, there was little or no previous preparation by any Department with specialized industrial knowledge. Lord Weir inherited from him a good supply organization and rapidly expanding production which further increased in quality and quantity during the brief period in which he was Director-General of Aircraft Production.

Similarly, when the M.A.P. was formed in 1940, the first step was the selection by Lord Beaverbrook of picked men with industrial experience; and the almost miraculous increase in output from that time was due to direct contact at high level with industry and to the bringing to bear of so much energy by men who knew exactly how and where it could be most efficiently applied. Lord Beaverbrook had the advantage over Lord Cowdray that for nearly eight years foundations for both development and supply had been laid by Lord Dowding; also that for at least a year before the M.A.P. was formed the man responsible for development was Lord Tedder.

Another good feature of production in the 1914-18 War was the employment in every firm producing major items of equipment, such as aircraft or engines, of a naval officer with good inspection and production experience. It was not the custom in the Royal Flying Corps to employ anyone who was not a pilot, so officers for this job were not available. When the Air Board was formed the naval officers were taken over from the Admiralty, and as supply expanded these so-called Production Officers were of immense assistance, not only to the firms but to the newly-formed Royal Air Force. It is to be noted that they were really engineers; but in the interval between the wars the Air Ministry could not bring itself to provide officers with adequate industrial or production experience.

With one exception, all the best features of high speed production originated during the twelve months in which Lord Beaverbrook was at the M.A.P. It is odd to think that it was not until 1940 that bulk buying of items previously in short supply was adopted. This procedure was first applied to bolts and nuts, of which 1,700 different sizes and kinds were employed in the aircraft programme. By lumping together all the orders from all the aircraft manufacturers and placing contracts which would run all the year round, output was tremendously increased and £2,500,000 saved. A similar procedure was afterwards applied to certain grades of electrical cables for use in aircraft, again with a saving in money measured in millions. For each of these " blanket contracts," the aid of the appropriate Trade

[5] *Ibid, paras* 81-82.

Association was brought to bear; and in the second the firms in the cable ring divided the order fairly with those outside it.

From bulk buying two other beneficial improvisations developed. One was the largest possible measure of standardization during the later stages of the aircraft programme, and the other was bulk buying to British drawings in the United States. Fortunately, a comparatively junior officer had foreseen the necessity for the latter and had, at a very early stage in the development of the M.A.P., sent to America drawings which included schedules and specifications of the 1,700 types of bolts and nuts required by the programme. Lord Beaverbrook decided that an order for six million dollars worth of these items was to be placed by cable on a Friday afternoon. The order was sent in forty words almost within the hour.

When Lord Tedder was responsible for development, he was always accessible to any Production Officer who wanted help. To give only a single example, there came a time when the heavy and expensive system of screened wiring in aircraft looked like proving a bottle-neck in production. Lord Tedder initiated a conference at which he personally presided weekly and, in a matter of only a few weeks, a new type of emergency aircraft wiring was not only designed but in production by the General Electric Co., Ltd.

In the one exception referred to above, Sir William Weir had an advantage over Lord Beaverbrook. His daily conferences frequently included officers straight from the front; and it was a striking experience to be present at a meeting with Sir William in the Chair, John Baird (afterwards Lord Stonehaven) beside him, looking down a table with production representatives on the one side and officers such as John Salmond and Christopher Courtney on the other—the latter straight from Dunkirk and wearing the blue and gold of the R.N.A.S. Contact between supplier and consumer was extremely close. Lord Beaverbrook's august council was denied this privilege, with perhaps the single exception of visits from Lord Dowding, then in charge of Fighter Command.

Creeping Paralysis

In both wars there came a time when the curve of aircraft production first of all flattened out and then became inadequate, and this was most marked in the newest types of equipment, not necessarily aircraft alone, most in demand by the units. Harris refers frequently to the inadequate supply not only of heavy bombers but of certain types of bombs; or incendiary or specialized equipment which in his opinion would have saved the lives of bomber crews. He failed to get them because the impetus of Lord Beaverbrook had expended itself and the inertia of an enormously increased Ministry had begun to creep up on the energetic specialists from industry.

Lord Beaverbrook secured his greatest effect when his Ministry was at its smallest and his dynamic energy could penetrate to every corner of it at any hour of the day or night. As his staff increased, it seemed to develop a kind of obstructiveness, and this continued to grow after he left. It is to be noted that when he took over the Ministry of Supply—already an enormous accumulation of Civil Servants, both permanent and temporary, the effect of his impact was almost negligible. The same thing happened in the 1914-18 War. When, in 1918, the Air Board was succeeded by the Air Ministry, the Supply Departments were transferred to the Ministry of Munitions. The then Minister, newly appointed, was Mr. Winston Churchill. Again, the impact of his proved genius for organization and the immense industry of a Winston Churchill in the very prime of life, was not impressive with a vast Ministry already growing lethargic as regards aircraft production. Nigel Balchin—

a business man himself as well as an author, is aware of this tendency; on page 62 of *The Aircraft Builders*, he says :—

> " When a business expands beyond a certain size . . . it is liable to undergo a period of ' indigestion ' before it solves these new type problems and settles down in its new form."

Expansion of the non-productive Civil Services of this and other democratic countries has been so great that the indigestion has become chronic, and incurable without a major operation. Like some monster of the prime, the tendency is for a Ministry to grow so big that messages from the brain no longer result in movement at the extremities. The same thing happened to the Roman Empire. The process is accelerated, especially during an emergency, by " empire building " : the growth of the clerical and statistical side of a Department at the expense of its technical, industrial and executive brain—a great increase in the number of people authorized only to say " No." Some sections used to make a practice of keeping records of the number of letters or other papers written weekly so as to be able to demand an increase of staff as paper work increased. A section so enlarged does not always disgorge its additional clerks when work becomes less : that would mean a loss of status and perhaps remuneration, and the man in charge might lose to other sections the few friends he had brought in. Another tendency is to initiate a flow of correspondence between sections at low level—a kind of eddy current which goes round and round and performs no useful work. Aircraft production becomes secondary to the maintenance of the paper flow. No clerical staff will get more pay if there are more aeroplanes, in fact they might get less if aircraft supply were to reach a satisfactory level ; but increased paper means more prestige, more overtime, and more wages.

The same thing happens even with the business-like Americans. Here are a few lines from an article in one of their journals :—

> " Big Government is here to stay. By 1948, Government employment may be as high as 1,900,000. The size of a Government employee's salary is determined largely by the number of employees under his supervision. Vigorous and efficient Government administrators find themselves prisoners of the organizations they are supposed to be running. . . . Lawyers, economists and statisticians . . . may rely too much on legalistic, or economic, or statistical approaches to specific problems to the detriment of practical solutions."[6]

The American article cites one clerical section reduced from ninety employees to only ten, with a great increase in efficiency. Harris makes a similar comment.[7]

It is refreshing to record that once during the life of the M.A.P., an expert organizer organized his directorate out of existence, securing earlier and larger deliveries, releasing valuable men to other sections and saving the tax-payer £50,000 a year. He came, in 1940, to take charge of motor transport supply for the R.A.F., and soon reported that it would be better for the Service to take every fifth vehicle off War Office and Ministry of Supply deliveries instead of depending on belated M.A.P. orders which secured delivery only at the end of the War Office contracts. A large directorate was replaced by two or three R.A.F. officers joining the staff of the Ministry of Supply. But this example must be unique.

In both wars, the Departments concerned with aircraft supply suffered from parasitic growth, and this explains the complaint made by Harris that even late in the

[6] " Can we reform our Bureaucrats ? " in the *Saturday Evening Post* of 10th May, 1947.

[7] Page 49 of *Bomber Offensive*.

War he could not secure adequate deliveries of heavy bombers or even small items of equipment vitally needed, and had to place private orders on his own responsibility.[8]

At least in preparation for the 1939-45 War, Supply Departments might have been planned and personnel tentatively allocated in advance to the posts they would have to occupy in war, as all the Services allocate regular officers. But it seems clear that war-time Ministries should be organized and staffed on new lines; they are not greatly improved since the mistakes of the Crimea or South Africa.

Air Power Must be Earned

From the mistakes we have made in the past it is possible to deduce a procedure for aircraft production before and during another great war which might make all the difference between catastrophic decline and the survival of the British way of life. More than ever before, that war would be a contest of material—a battle between factories, with the science and industry of democratic and tolerant nations ranged against what Mr. Churchill has called " the Potential Aggressor." Even now it is possible to see that the success of weapons almost beyond our imaginings will depend upon aircraft and their equipment, and that we shall need an output of fighters, light and heavy bombers, trainers, and transport aircraft, no smaller than that at the peak of our war effort in the 1939-45 War.

The Government of a democratic country will always be carried on through a civil service. Between the wars and during the late war, the Treasury at least was anxious to bring Departments into line with modern organization and methods used in industry, but without much result. Inefficiency next time, or the further growth of a parasitic bureaucracy, might prove our undoing. While we still have a Ministry of Supply, it should first of all be reorganized to conform with the methods of industry, and then develop an organization suitable for war. A Royal Commission on the Civil Service, and particularly on the adequacy or production in preparation for war, would be better for the nation than mere departmental re-organization.

Control of industry by industrialists rather than by clerks seems desirable, but that control should be exerted through qualified men. In both wars, captains of industry who had been lent to a ministry sought the help of men from their own staffs rather than employing non-technical and non-business officers or civil servants. Technical staffs should be trained now. The routine work of planning in preparation for war might be carried out by an organization created from staffs of the firms concerned, and this would minimise in peace the immense burden of non-productive expenditure. A further economy, and a gain in efficiency, would be secured by the employment of consultants, including those who could teach us something about incentives. An incentive does not necessarily mean more pay, and great firms know that there are ways of getting more work for less pay.

The alternative is to develop within the next few years serving officers and civil servants of a new breed; to construct in time of peace an outline of what staff a Ministry would need in time of war; to select and train men now for its enlargement when necessary; to have available a reserve of real production men (as distinct from clerks dignified by that name); and when war breaks out to exercise rigid

[8] *Bomber Offensive*, p. 269, " The greater part of our national resources went into the production of less powerful and sometimes wholly obsolete weapons." On p. 157—" weapons produced by the official organization were too often failures." Page 109—" To extract the equipment we so desperately needed from the torpid departments which had withheld them for so long."

control over the influx of temporary personnel not planned for, sometimes the rejects of industry. The desirability of scientific and technical staffs has been suggested already in two recent volumes of the JOURNAL.[9]

An enlightened Government, backed by an intelligent people, should lay down its plans for home defence and stick to them. It would then become possible to calculate the material required, the equipment and accessories to be ordered, and to lay out a series of contracts over a term of years. We should not always begin our wars with no magnetos, insufficient aluminium and inadequate supplies of instruments and armament. Bulk buying in this country and the U.S.A. will certainly be necessary. If handled by experts, it standardizes the product, increases output by more than 25 per cent., and saves millions of pounds.

Such a plan will show the need, from a production point of view, for close liaison with the U.S.A.—a nation not likely to be found on the opposite side in a world war. Here, again, the greatest possible measure of standardization should be sought before the war as regards specifications and dimensions. All possible information should be supplied, including some indication of the size of orders and the delivery which would be required. In addition, there should be a tentative allocation of the personnel—senior and junior, of the buying commission; this would permit pre-war contact with their opposite numbers in the U.S.A.

In both wars two important functions of production were neglected, or at least not pressed forward, until Lord Cowdray in one war and Lord Beaverbrook in the other, took over control. These were repairs and the equipment and testing of complete aircraft where this work became too much for the makers. "In Britain, in May, 1940, there was a mounting total of damaged machines lying useless for want of an effective repair organization."[10] The Aircraft Acceptance Parks, in 1918, housed and equipped aircraft by the thousand. Should war break out, such a planned expansion would be far more efficient than one which, to industrial eyes, was ill-prepared for.

There remain two points in which production could be made much better than in the late war: more frequent contact between the Minister's Council and Air Officers from Commands at home and abroad, even though such contacts were entirely unofficial; and some means of ensuring that modifications to aircraft equipment should, in general, be those called for by the consumer, and not those resulting from the bright ideas of some junior officer with no experience of manufacture and not much of operations. There will still be what used to be styled Class I modifications, to be urgently incorporated to ensure increased safety in flight.

There is nothing very new in these suggestions. Practically all have appeared before, spread over a wide range of publications, some with no connection whatever with aircraft production. Of these publications, the most fruitful has been the Journal of the Institution. As a final proposal, could not the important subject of preparation for war—whether preparation of ships, tanks, guns, aircraft, men or women—be discussed by the Institution every other year, as a sort of stock-taking and report of progress?

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[9] Sir Henry Tizard's lecture on "Science and the Services" in the JOURNAL for August, 1946, and Brigadier E. M. Hordern's article on "Technical Planning in War," in the JOURNAL for August, 1942, p. 232.

[10] *The Sky's the Limit*, by David Farrer, p. 15.

NAVAL RESEARCH AND DEVELOPMENT

From an Official Source

A VAST amount of fundamental scientific work has been accomplished by Admiralty establishments during the past decade and a very large amount of work is envisaged for the future in order to keep the Royal Navy in the first rank of efficiency. Many lines of enquiry present themselves for patient and exacting investigation. On the defensive side, the Navy has to apply the lessons learned by its observers of the Bikini tests of the atomic bomb ; but the implications of atomic energy are, in the long view of the naval situation, by no means limited to defensive aspects and may, contrary to initial reactions, lead to an enhancement of naval power in a highly modified form and with wide offensive and defensive commitments. The atomically propelled warship, for example, would have no immediate refuelling problems and the period for which it could stay at sea would be limited only by other and generally less urgent supply problems—a vital factor if the ship proved less vulnerable than the harbour. Again, a revolution in naval ordnance in the light of the guided rocket missile opens a field in which research is essential to security. The Navy's commitments, which already include the convoying of food across the oceans, may even extend to assisting in the discharge of cargoes on coastlines where ports are improvised on the Mulberry system.

More than six million pounds is the estimated expenditure by the Admiralty on naval research and development during the present year. Owing to the very large variety of naval technical requirements, the allocation of this sum has to be carefully considered, but as the First Lord of the Admiralty said in presenting the Estimates, " within the limits of the resources available, priority continues to be given to the work of scientific research and steady progress is being made in the building up of the Royal Naval Scientific Service."

While much of the fundamental research is undertaken by members of the R.N.S.S., recruited from the Universities and from among industrial specialists of proved reputation, a large contribution is made by members of old-established departments, such as the Royal Corps of Naval Constructors, who design ships ; the Engineer-in-Chief of the Fleet, who powers them ; and the Director of Electrical Equipment. These technical departments are co-ordinated by the Controller of the Navy, who is the Third Sea Lord and who is responsible for the supply of all material to the Navy. A most important feature of the organization is the employment ashore, for periods of two or more years, of naval officers who have served afloat in both the Executive and Technical branches of the Royal Navy. It may be confidently asserted that this feature was one of those which led to British naval material proving superior in quality to that of the Germans. Enquiries conducted at the conclusion of hostilities showed that, while an immense and imaginative effort had been made by German scientists, much of the German equipment lacked the robust features and operational simplicity which was a virtue of the British material—the hall-mark of the man with sea experience.

Data and prototypes which would be outside the scope of commercial concerns emerge from some of the Admiralty establishments and many naval scientific investigations have commercial by-products. It is possible to instance the development of new and economical furnace technique for the burning of heavy fuels for the production of power, the use of steam machinery of high temperature and pressure conditions, aspects of gas turbine and oil engine design, improved navigational aids

and the development of fire resistant materials, all of which have direct or indirect bearing on mercantile practice.

It is almost impossible for a single mind to grasp the nature of all the problems involved and it is certainly impossible to give detail in any simple form. All that can be done is to enumerate the institutions and to give a brief outline of the kind of work which they undertake.

For a start there is the rather generalized work of the *Admiralty Research Laboratory*, under the Director of Physical Research. It deals with all subjects upon which fundamental research is needed other than those studied in the more specialized works and laboratories. The subjects in which experiments are made in this laboratory include acoustics, aeronautics, oceanography, under-water ballistics, instrument making, photography, camouflage, luminescence and such matters as the packing materials for various kinds of equipment and stores.

Another maid of all work—the *Admiralty Chemical Department*, founded in 1870, deals with general chemical problems for various departments, dockyards and depots. The field includes explosives, food, paints, anti-fouling compositions, lubricating oils and greases, rubber, plastics, toxic gases liable to be encountered in ships, insecticides, fireproofing, insulating materials, and boiler and evaporator water problems, including anti-corrosion methods.

The Admiralty Experimental Works and the *Naval Construction Research Establishment* both deal with physical problems such as are encountered by the Director of Naval Construction. The first is largely concerned with experiments on a comparatively small scale in water tanks, while the latter organizes large scale experiments at sea. At the works there are tanks for testing the effects of various ship shapes passing through the water, cavitation tunnels for propeller research, apparatus for testing the effects of vibration and shock, and tanks for testing steering gear. The Research Establishment has its own floating laboratory—H.M.S. "Barfoot," a former boom defence vessel, but the work is much too broad to be carried out from a single ship and experiments are made off shore with a variety of targets, some specially constructed to simulate sections of new ships and some consisting of old and redundant ships. Both types are used in assessing the effects of weapons on warships, and these effects are accurately studied with elaborate measuring instruments.

The specifically engineering researches of the Royal Navy are conducted at the *Admiralty Engineering Laboratory*, where work on gas turbine development is among the projects in hand. At this laboratory the internal combustion engine for submarines was pioneered and various gearing problems are studied.

In matters of chemistry both the Director of Naval Construction and the Engineer-in-Chief of the Fleet consult the Chemical Department or one of the two laboratories dealing with metallurgy. First of these, the *Admiralty Central Metallurgical Laboratory*, deals with foundry processes, welding and jointing, fabrication methods, heat treatments, metal cleaning and machining problems. It also is concerned with those aspects of marine biology which bear on the diagnosis of the cause of corrosion in boilers and other equipment. Work in *The Bragg Laboratory* is largely devoted to safeguarding the quality of materials, used in the building of warships and advising on the types of materials, their treatment and methods of inspection.

Improvements in the design and performance of all kinds of electrical gear, including switchgear, batteries, cables, fuses, lamps, logs and other recording instru-

ments are the province of the *Admiralty Engineering Laboratory* (*Electrical Department*). A major commitment at this Laboratory is submarine equipment, a great proportion of which is electrical.

Both the radar and radio aspects of electricity are studied at the *Admiralty Signals Establishment*, which is the largest of all naval research institutions. Since the early days of naval warfare, communications have been vital and, to-day, a flagship must incorporate a nerve centre which is in many ways more complex and more rapid in reflex than a post-office ashore. Radar has expanded with mushroom rapidity ; originally a means of locating enemy aircraft, it now embraces the location of enemy ships, navigational aids and has become virtually a component in naval ordnance and ammunition.

The Service Electronics Research Laboratory—a new addition to the Combined Services research facilities, is under Admiralty direction. It is concerned with research on short wave valves and the pursuit of those lines of enquiry inspired by the British discovery of the magnetron, which is fundamental to radar development.

The Admiralty Compass Department has its mercantile associations. The Department devotes its energies to the development of magnetic and electrical navigational aids. It has produced equipment varying from large binnacles to small compasses for landing craft. During the recent war, it assisted the Army by designing compasses for station keeping by flail and other tanks which might be invisible to each other even during the day. Gyro-inductor compasses were also designed for aircraft during the War and, to-day, various improvements in the gyro-compass are under consideration.

The Craft and Amphibious Material Department came into existence to deal with requirements for all kinds of curious marine monsters and its products belie any idea that the naval mind is incapable of the unorthodox. Its projects have varied from tiny silent-approach electrical canoes to large floating airfields.

The institutions so far described cover most of the range of marine requirements, but not the problems concerning specific weapons and their antidotes. The detailed study of these problems lies with the *Naval Ordnance Department*, the *Torpedo Experimental Establishment*, the *Mine Design Department* and the *Anti-Submarine Experimental Station*. Each of these establishments has a wide field of its own involving physical and chemical questions which may in part be referred to the more general laboratories but which inevitably call for detailed and specialized experiments. The Ordnance Department, which copes with everything from 16 in. hydraulic gun mountings to minute electrical and optical equipment for laying and ranging, now has experiments with rocket missiles added to its commitments. To the large variety of propulsion devices and warheads in torpedo work, came the additional problem of homing devices. Magnetic and acoustic mines, mines laid from the sea and the air, widen the range both offensive and defensive of this once simple method of waging war at sea.

In addition to the material problems, to which there are scientific answers, there are medical, psychological and dental problems. In every sphere there is need for co-ordination and cross reference. For instance, the habitability of ships is primarily a matter for the Constructor but it has its engineering and its medical aspects. All the scientific work is co-ordinated by the *Chief of the Royal Naval Scientific Service* and the three small groups of scientific administrators directly under him. He is responsible for considering inventions and suggestions made by the public, which, at one peak period during the recent war, averaged no less than a thousand a day.

HOW TO DELIVER A LECTURE[1]

By GEOFFREY CRUMP, M.A.

Good speaking is at least three parts thinking. And thinking does not consist in staring at a blank sheet of paper and waiting for the spark from Heaven to fall. It is hard work. Ideas are valuable—valuable as the treasures discovered by the antiquarian ; but like these treasures they have to be dug out and sorted before they can be displayed to the public gaze.

It is outside my province to-day to talk about style, but I must say a little about language. A good speaker hits the happy mean between a style which is so colloquial as to be undignified and the other extreme of " talking like a book." My own opinion is that there should be much less difference than is commonly supposed between the language of an article and that of a lecture, because each should resemble the other more closely than it generally does. I mean that most writing is too pretentious and would-be " literary," whereas most speech is too slipshod and clumsy. The all-important thing is to find always the exact word to express your thought, and to avoid on the one hand *clichés* and slang expressions such as " sort of " and " terribly decent," and on the other hand pretentious verbiage such as " being somewhat inclined to differ " instead of saying " No." To speak quite simply and unaffectedly is extremely difficult, and needs practice and discipline. Good speech, like good writing, should be concise, easily understood, and agreeable—whereas too often it is needlessly verbose, difficult to follow, and irritating. It is perhaps even more desirable, for the general enjoyment of life, that these qualities should be present in speech than in writing, for, though one can generally refuse to read what is badly written, one is often obliged to listen to what is badly said. When I was in the Army I frequently heard lectures that were a disgrace to the lecturer and an insult to the audience, and many of them, I regret to say, were by staff officers—but of course that was a good many years ago, and all that is changed now. Some of those lectures were fortunately inaudible, though this is not a quality that one commonly looks for in a lecture. But those that could be heard were frequently futile, sometimes unintelligible, and always dull. The first requisite is, of course, a thorough knowledge of your subject ; granted that, half the battle is careful planning and preparation.

Is it best for a speaker to write out and read what he has to say, or to speak from notes, or to dispense even with notes, and simply talk ? Opinions differ widely about this ; but I am sure that the ability to speak without notes is a rare gift, and difficult to cultivate. Moreover, this kind of speaking, though it appears to be done on the spur of the moment, is, if it is effective, more often the result of assiduous preparation. Many speakers write down in full what they are going to say, and learn it by heart, in order to appear spontaneous. But I must say that from careful observation of what one might call " amateur " speakers, the best are undoubtedly those who do rely to some extent on script or notes. Careful planning of a speech is essential, and too often the speaker who gets astray from his plan loses all sense of logic, and very frequently all sense of time too. I recommend that anything that is to be said should, if time allows, be written down in full ; it can then, if you like, be reduced to notes—but either in its full form or in the form of notes it should be before you as you speak. If circumstances make this impossible, reduce your notes to the smallest possible proportions, commit them to memory, and rehearse your speech carefully, on timetable. The important thing about these notes, by the way, is that

[1] This is part of the Lecture on " The Art of Giving a Lecture " by Mr. Geoffrey Crump, republished from the R.U.S.I. JOURNAL for November, 1935.

they should cover your transitions. Too often notes consist of just the things that one would remember anyhow—main headings, and so on. It is easy to remember the chief points that one means to talk about, but it is easy to forget what one was going to say about them ; and a speaker who gets hung up, you will notice, generally does so not because he has forgotten his next point, but because he has made no provision for getting from one point to the next. It is such difficulties that your notes should provide against. I like to have the full script with me when lecturing, though I never read it throughout, or keep strictly to it in detail. But I have practised reading in such a way that my audience cannot usually detect whether I am reading or speaking. Most people seem to find this a difficult accomplishment, but I think it should not be, especially if you are accustomed to acting ; and if you can learn to do it, it will save you a lot of time and trouble in preparation.

Whatever method you adopt, you must not appear to be reading, and you must ensure that what you say is clear to your audience. The two chief qualities required of a speaker are intelligibility and audibility. It is no use the audience being able to hear you if they cannot understand you ; nor is it any use their being able to understand you if they cannot hear you. Now let us pass on to the actual business of speaking.

THE DELIVERY

PRONUNCIATION.—The moment you begin to speak, you should try to sense your surroundings as much as possible ; rooms and halls vary very much in the way in which they treat your voice. In a room where there is any echo, or metallic resonance, or in the open air, it is fatal to shout ; if you do, the vowels will make such a noise that the consonants will not be heard at all. It is seldom necessary to speak very loud, and never necessary to shout ; what is necessary is clear articulation of the consonants. An actor who articulates his consonants clearly can make a whisper heard all over a big theatre. The importance of consonants is obvious if you think about it. Vowels will look after themselves. It is easy enough to distinguish between " robot " and " rabbit," but very difficult to distinguish between " rabbit " and " rapid." Final consonants are important ; a lot of unnecessary trouble may result from mistaking " he's in the *bath* " for " he's in the *bar*." A good way of practising clear articulation is to speak as if annoyed—" Don't—do—that." Only a small proportion of consonants are true consonants—many, such as m, n, ng, l, w, can be vocalized like vowels. Compare the first of the following passages, which contains only vocalizable consonants, with the second, in which the consonants are all explosive sounds that cannot be sustained :—

" Many a lonely man will wander here,
Thinking of home."

" Did Dad touch Bob and Ted ? "

The secret of clear articulation of consonants is to keep the lips, tongue and teeth mobile. The secret of clear and accurate vowel enunciation is to realize what is the position of the lips, tongue, and teeth for each vowel sound, and to keep these exact and distinct. To most educated people this comes naturally, but it is always necessary to be on the look-out for bad habits. The Oxford " Good-bahe," the Mayfair " Ha-d'you-doh," and the American " carnference," are really quite as inaccurate as the Cockney " Piper, lidy," or the Glasgow " Ha'e ye go' a bo'tle ? " I have helped people to cure themselves of that most ugly and insidious trick of " eow " for " ow," by pointing out that it is only a matter of keeping the tongue absolutely flat on the bottom of the mouth.

We have not time to go at all fully into the matter of voice-production, but there are just two points that may save both you and your audiences from fatigue. The first is to speak on to the hard palate in the *front* of the roof of the mouth, which not only gives resonance to the voice, but also saves the more sensitive soft palate at the back of the mouth from becoming inflamed. The second is to breathe as deeply and as seldom as possible. A reserve of breath gives force and control, and constant breathing causes hoarseness. What is generally known as " dropping the voice " at the end of a sentence, so that the last few words are inaudible, is due, not to speaking these words on a lower note, but to deflating the lungs a moment too soon.

PITCH.—It is, of course, in the management of the pitch of your voice that most of your opportunity for effect lies. It is in this way that you secure emphasis and contrast and, above all, sustain interest. Most speakers use far too many downward inflexions. The voice should be kept on an upward inflexion except at a full stop—and very often then too, and a really full close should only be used when a definite effect of finishing is required before passing on to an entirely fresh point. Do not forget to begin on a low note if you want to work up to an effective climax, otherwise you will find yourself with nothing left to do but scream. The meaning of words and phrases, as well as the intention of the speaker, can be changed entirely by the inflexion of the voice. Think of all the different meanings that can be given to the simple phrase " You do " by the use of different inflexions. The more variation of pitch and the more inflexion you can use, the more interesting your speaking will sound; in fact, the word " monotonous," which really means " speaking on one note," has come to mean " dull." On the other hand the over-use of inflexion, as in stories told to young children, is irritating. But somehow or other you have got to get this feeling of interest, this sense of force and importance, behind what you say, or your audience will not be interested. Even if what you say is really pretty dull, you can make an audience believe by your manner that it is interesting—at all events it is usually some time before they find you out, and you may get away first! But they will never believe that it is interesting if it sounds dull. In fact, there is no doubt that what you say is not really so important as the way in which you say it—a regrettable fact, perhaps; but such is human nature.

PACE AND MICROPHONES.—Pace should vary continually. In the first place, it should vary according to the size of the building and audience; the larger these are, the more slowly you must go. Of course microphones are now in almost universal use in large buildings, and for outdoor gatherings. For indoor purposes—at all events for studio work—one should talk into a microphone more or less as in ordinary conversation, only very distinctly. Outdoors it is generally necessary to speak much louder. The microphone tends to flatten the voice, and it is advisable to use much more varied inflexion than in normal speech.[1] Remember always to keep your head still when speaking into a microphone. It is always advisable to rehearse, because an electrician can do a great deal to modulate the microphone to your voice. There is really no reason why the average person who speaks well should not amplify well.

If you are speaking without amplification from a platform or stage, you should always go rather more slowly than you feel to be right. If you think a pause is necessary, make it a little longer; if a stress, a little more emphatic; if you are trying to go slowly, go a little more slowly. It has to be remembered that the audience never hears every word; many of the words they have to guess from those

[1] Experience has shown that a loud-speaker installation cannot assist lecturers who do not enunciate clearly or whose delivery is monotonous, as it tends only to magnify these defects—Editor.

that they do hear : somebody sneezes or scrapes a chair, and a word is missed. You must allow time, by speaking slowly, for the word to be guessed from its context. It is particularly important to speak very slowly and clearly for the first few minutes, until your audience have accustomed themselves to your voice, and you have got used to your room and have, as it were, " established contact " with your audience.

EMPHASIS.—Besides making all that you say audible, your object is to emphasize the most important points. There are many ways of securing emphasis, and as the whole effect of your speech depends on your success in emphasizing what is most important in it, it might be well to consider these.

Pitch, Volume and Speed.—Pitch is the commonest way. One instinctively raises the note on the word to be emphasized ; also the volume may be changed. To say a word louder or more softly than the preceding words draws attention to it. A sentence that is to be emphasized may be said at a slower speed, and the words spaced out.

Repetition.—An obvious method of emphasis is repetition ; and so is a pause, generally before, and sometimes after, the word to be stressed.

Antithesis.—It is a great help to the clarity of your argument if constant use is made of antithesis, on both a large and a small scale. If you have to argue the pros and cons of anything, you can take either black and white, black and white alternately, or all the whites and then all the blacks, or all the blacks and then all the whites ; ending up, of course, in any case with the conclusion that proceeds logically from your treatment of them. Use your voice, too, to point the smaller antitheses, making the contrasts by alternate upward and downward inflexions.

Tension and Climax.—I have already pointed out the importance of climax in oratory. It is well to make more use of what is called the " periodic " form of sentence than one would in writing. This form of sentence is so constructed, by holding the main verb, that it does not make complete sense till you come right to the end of it. Burke used sentences that went on for a page and a half before he came to the main verb, and it was impossible to help listening. For though the subject-matter may be dull and the room stuffy, though the speaker is not yet at the end of a lengthy discourse, and even though the audience may not really *want* to know what he is going to say, yet there is something, some power—the same queer power, perhaps, that makes people sit up late to finish a novel or watch with breathless excitement a tight-rope walker near the end of his rope, though they would be bored if he stood still—there is, I say, some power that attracts, invites, nay more, compels, the listener to go on listening through sentence after sentence, until at last, with a sigh of satisfaction and relief, he is steered home to what is, after all, no more than the main verb. In addition to using this type of sentence, remember that it is doubly important so to arrange what you have to say as to ensure that creation of tension and expectancy that I have already indicated as desirable. It is said that in a play the audience should gradually realize what is going to happen, but should not know until quite near the end *how* it is going to happen. The same principle may be applied to a speech or lecture. The argument should unfold itself clearly, but it should not be clinched until the climax is reached ; and the climax should not be reached too early.

Manner.—Gesture is generally unpopular with any but the most practised speakers; it is often said to be theatrical, and people think it is " absurd to wave one's arms about." So it is ; but gesture does not mean waving one's arms about. When gesture is properly used, you hardly notice it, though you feel its effect. Probably gesture that is learnt and practised is seldom effective, but if you feel a

natural desire to make use of your hands, fingers, shoulders, or eyebrows, by all means do so, though nobody would wish you to wave them about.

The attitude in which you stand to speak should be dignified and assured, without being pompous or overbearing. Try to avoid fidgeting; the audience are watching you closely, and every time you fidget about for no reason, they think your movement may have some meaning which it has not, and in a short time they will become too impatient to listen to you. It is best not to address yourself to individual members of the audience, but to speak to the back of the room, just above the heads of the back row. You thus give the impression to most of the audience that you are speaking to the people immediately behind them.

A great deal depends upon personality and manner. If you are nervous and uncomfortable, your audience will be nervous and uncomfortable too. If, on the other hand, you appear to be enjoying yourself, they will probably enjoy themselves also. An assured and easy manner is not difficult to cultivate if you know exactly what you are going to say and how you are going to say it, and if you are confident of your ability to make what you have to say intelligible and audible to your audience. And lastly, may I suggest that what is commonly called "charm of personality" is, as in writing, only achieved by those who are free from self-consciousness. It is paradoxically true that the speaker who appears to achieve most by his personal charm is the speaker who is least conscious of it. The audience are, or should be, more interested in the speech than in the speaker; and if he concentrates, not on doing himself credit, but on conveying what he has to say to his audience, then he has every chance of winning their sympathy and interest.

WHAT TO READ—IV[1]

THIS, the concluding article of this series, deals essentially with literature relating to the human element in the Services including :—

Manning—
- Manpower
- Officers
- Recruiting
- Conscription
- Reserves and Auxiliary Services
- Cadet Corps

Training—
- General
- Combined
- Navy
- Army
- Air

Morale—
- Leadership
- Welfare
- Tradition

Uniforms, Orders and Decorations

Arrangements are being made to republish these articles on " What to Read " in pamphlet form. It is intended to bring out new editions from time to time so that the pamphlet can be kept as up to date as possible, but the attention of Members is invited to the list of Additions to the Library published quarterly at the end of every Journal.

MANNING

MANPOWER

R.U.S.I. Journal

Manpower and the Services—August, 1947.
Economy of Manpower in the Services—August, 1947.

OFFICERS

R.U.S.I. Journal

The Officer-Producing Class—May, 1946.
The Qualifications of a Fighter Pilot—August, 1942.
Standardization and Specialization—November, 1939.
Officers Reserves and Organization of National Manpower—February, 1939.
Supply of Officers for the Army—November, 1931.

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[1] No. I of these articles appeared in the JOURNAL of August, 1946. It dealt with literature relating to : International Affairs ; Relations with the Dominions, Colonies and India; Imperial Defence ; and the Higher Study of War.

No. II appeared in the Journal of February, 1947, and dealt with : Strategy ; Combined Operations ; and Major Wars and Campaigns.

No. III appeared in the Journal of May, 1947, and dealt with: Tactics and Weapons ; Command and Staff ; and Science and the Services.

Recruiting

The People's Army—Clive (1938).
Kitchener's Mob—Hall (1916).

R.U.S.I. Journal

Incentives to Recruit—August, 1947.
Recruiting for Infantry—November, 1946.
Lower Deck of the Future—May, 1946.
The Buckler of the New Order—May, 1943.
Recruiting—A Visit to Blackpool—May, 1938.
Army Recruiting—February, 1938.
Our Best Recruiters—February, 1938.
Naval and Military Recruiting—May, 1937.
Some More Aspects of the Recruiting Problem—February, 1937.
Recruiting and Unemployment—November, 1936.
Army Recruiting—August, 1935.

Conscription

The Case for Compulsory Military Service—Coulton (1917).
Fallacies and Facts—Roberts (1911).
Compulsory Service—Hamilton (1910).

R.U.S.I. Journal

Universal Service—The Women's Part—November, 1944.
Universal Service—A Suggested System—August, 1944.
Interviewing for the New Militia—August, 1939.

Reserves and Auxiliary Services

Women in Uniform—Wadge (1947).
The Territorial Army To-day—Dunlop (1939).
The Territorial Army—Codrington (1938).
History of the Volunteer Forces—Sebag-Montefiore (1908).
History of the Volunteer Infantry—Berry (1903).

R.U.S.I. Journal

(*a*) Naval

The R.N.V.R. and Its Future—November, 1946.
The Work of the W.R.N.S. in the War—February, 1946; February, 1942.
The Future of our Naval Reserves—May, 1944.
Yachtsmen as a Naval Reserve—August, 1935.

(*b*) Army

The Auxiliary Territorial Service and Its Future—August, 1947
The Work of the A.T.S. in the War—May, 1946.
The Home Guard—May, 1942.
Territorial Army Staffs and Training—August, 1939.
The Organization and Training of Territorial Army Units—February, 1939.
The Officers' Training Corps—November, 1938; August, 1935.
The Development of the Territorial Army—August, 1938.
The Territorial Army—May, 1936.
A Junior Division of the O.T.C.—May, 1936.

(*c*) AIR

The Work of the W.A.A.F. in the War—August, 1946; August, 1942.
Air Transport Auxiliary—May, 1943.

CADET CORPS

R.U.S.I. Journal

(*a*) GENERAL

Youth and National Defence—November, 1938.

(*b*) NAVY

Sea Cadet Corps—November, 1942.

(*c*) ARMY

Army Cadet Force—May, 1946; August, 1942.
Gordon Boys School—February, 1945.
The Constitution and Functions of the Cadet Force—November, 1938.

TRAINING

GENERAL

R.U.S.I. Journal

Education and the Services—May, 1946.
Training for Higher Command—August, 1939.
The Art of Giving a Lecture—November, 1935.

COMBINED

Operation " Neptune "—Edwards (1946).
Combined Operations—Official (1943).

NAVY

Running a Big Ship on " Ten Commandments "—O'Conor (1937).

R.U.S.I. Journal

Flying for Naval Officers—August, 1939.
A School of Ship Handling—May, 1939.
The Importance of Studying Naval History—February, 1939.
A Naval Catechism—May, 1933.

ARMY

The Home Guard of Britain—Graves (1943).
Raising and Training the New Armies—Williams (1918).

R.U.S.I. Journal

Training a Citizen Army—May, 1946.
Army Training after the War—February, 1945.
Army Units and Mechanical Efficiency—August, 1941.
Suggestions for Unit Training—May, 1941.
Vocational Training—Re-organization—August, 1937.
Company Training—February, 1937.
A Waste of Time in Regimental Soldiering—November, 1936.
A Junior School of Tactics and Leadership—May, 1936.
Training Troops on Foreign Service—August, 1934.

Training of the Army for War—May, 1933.
Training and Employment of Regimental Officers—May, 1933.

Air

The Royal Air Force—Monk and Winter (1938).

R.U.S.I. Journal

Training of an R.A.F. Pilot—February, 1938.
Air Force Catechism—November, 1933.

MORALE

Leadership

Morale in Battle—Montgomery (1946).
Psychology for the Armed Forces—Edited (U.S.A.) (1946).
Military Leadership—Montgomery (1945).
Leadership for American Army Leaders—Munson (1941).

R.U.S.I. Journal

The Commander and His Officers—May, 1942.
The Higher Commander—February, 1941.
Drill and Discipline—May, 1939.
The New Leadership—August, 1936.
Modern Infantry Discipline—August, 1934.
Naval Discipline—May, 1932.
Panic in War—November, 1929.
Morale and Leadership—May, 1929.
Morale, Instruction and Leadership—November, 1920.

Welfare

Adult Education (Army)—Hawkins and Brimble (1947).
I'll Walk beside You—Trevelyan (1946).
Just as They Came—West (1946).
Service Pay—Grenfell (1944).

R.U.S.I. Journal

Casualty Evacuation—February, 1946.
Six Years of Army Welfare—February, 1946.
Pay and Pensions—February, 1946.
Army Welfare and Education—May, 1946; May, 1941.
Welfare Services of the Navy—May, 1945.
Employment of Soldiers on Demobilization—November, 1943.
Employment after Retirement in the Army—August, 1943.
Employment after Retirement—May, 1943.
Welfare in the Royal Navy—November, 1941.
Hygiene and the March—November, 1941.
Welfare in the R.A.F.—August, 1941.
N.A.A.F.I. Entertainments Branch—February, 1941.
Naval Canteen Launches—August, 1940.
The Health of the Soldier in War—August, 1940.

Victualling of the Navy—November, 1939.
Medical Care in the Tropics—February, 1939.
The Grouping of Infantry Depots—May, 1937.
A Group Mess for Officers—February, 1937.
The Inauguration of Army Pensions—August, 1935.
Man Maintenance—August, 1933.

Tradition

Britain at War Series :—
Royal Navy—Chatterton (1940-1946).
Army—Sheppard (1940-1946).
Royal Air Force—Charlton (1940-1946).
The Birth of the Royal Air Force—Chamier (1943).
England's Sea Officers—Lewis (1939).
The Royal Navy—Parratt (1930).
Ships' Records, Regimental Histories, Squadron Records.

R.U.S.I. Journal

The Regiment—May, 1946.
Tradition in H.M. Ships—A Comparison with the Regimental System—August, 1944.
Esprit de Corps—May, 1944.
Esprit de Corps in the Modern Army—February, 1944.
Naval Personnel in the XVI Century—May, 1942.
Regiments of the Glorious Revolution—November, 1938.
The Development of Regimental Routine—August, 1936.
Lower Deck Past and Present—February, 1936, and May, 1936.
Sedgemoor 1685—The Birth of Some Famous Regiments—May, 1935.
The Origin and History of Payment of Soldiers—August, 1926.

UNIFORMS

(NOTE.—Books on this subject are for reference in the Library only.)

Navy

Dress Regulations (1825-1937).
Naval Uniforms, 1746-1812 (Extracts from Army and Navy Gazettes, 1910-11).

R.U.S.I. Journal

Naval Costume Past and Present—November, 1921.

Army

A History of the Uniforms of the British Army, Vols. I and II (up to 1760)—Lawson (1940-41). Work still in progress.
Dress Regulations (1822-1934).

R.U.S.I. Journal

The Dress of the British Army—February, 1944.
Uniforms of the British Army—February, 1934 ; November, 1933.
Uniform for the Future Army—February, 1918.
Military Uniform—August, 1917.

ROYAL AIR FORCE

Dress Regulations (1929).

ORDERS AND DECORATIONS

(*NOTE.—Books on this subject are for reference in the Library only.*)

Ribbons and Medals—Dorling (1946.)
British and Foreign Orders, War Medals and Decorations—Payne (1911).
War Medals and Decorations—Irwin (1910).

R.U.S.I. Journal

American Decorations and Medals—November, 1944.
British Decorations—August, 1941.
British War Medals—August, 1939.

THE R.U.S. MUSEUM

By the SECRETARY

HIS Majesty the King has graciously presented to the Institution one of the Royal Standards worn by H.M.S. " Vanguard " during the Royal tour to the Union of South Africa. This interesting memento of that historic event has been hung at the South end of the Banqueting Hall.

The Captain of H.M.S. " Vanguard " has presented a large boat's badge with the ship's crest. This brings up to date a large collection of ships' badges which adorn the naval side of the Crypt and which includes those of such famous warships as the " Warspite," " Queen Elizabeth," " Rodney," " Iron Duke," " Marlborough," " Britannia," " Revenge," " Témèraire," " Illustrious," " St. Vincent," " Vernon," and many others with historic names.

MEDALS

Interesting additions to the Institution's large collection of medals are a number of Naval General Service Medals with unusual clasps, given by Lt.-Colonel Sir D. E. Dalrymple-White, Bart. The clasps include that given for the night action between the " Seahorse " and " Badere Zaffer," fought off Skopelos Island in the northern part of the Aegean on 5th/6th July, 1808, when the British frigate captured her Turkish opponent. Another clasp, inscribed " Off the Pearl Rock, 13th Dec., 1808," commemorates the action off St. Pierre, Martinique, in which a British force destroyed the French 18-gun corvette " Cygne " and two schooners. The British ships engaged were the " Circe "—frigate; the " Stork," " Amaranthe," and " Eperrier "—sloops; the " Express "—schooner; and the " Morne Fortunée "—armed brig. A detachment of the Royal York Rangers was serving in three of the ships.[1]

Another medal of this set carries two clasps, both for " H.M.S. Weasel." One, dated 22nd February, 1812, relates to the action in the Adriatic between this sloop with the French brig-corvette " Mercure " in which she blew up her opponent. She was then recalled to join in the engagement between the " Victorious " (74) and the " Rivoli " (74), and taking station in a raking position, poured several destructive broadsides into the French ship. The latter, after a spirited duel, surrendered to the British ship of the line. The " Victorious " was, however, so knocked about that the " Weasel " had to take the prize in tow. The other clasp commemorates the action in the same Sea, on 22nd April, 1813, between the " Weasel " and a number of French gunboats, six of which she destroyed together with eight of their convoy.

A clasp inscribed " Hebrus wh. L'Etoile 27 March 1814 " recalls the action between the British 36- and the French 40-gun ship off Alderney, which ended in the surrender of the latter, afterwards taken into the Service as the " Topaze," 38.

In all, 176 clasps were authorized for the Naval General Service Medal for Fleet and Ship actions and 55 for Boat actions. Although the medal was not introduced until 1847, it was awarded—with the appropriate clasps—to survivors of all ranks in actions fought between 1793 and 1840, including the battles of the First of June (1794), St. Vincent (1797), the Nile (1798), and Trafalgar (1805).

The Military General Service Medal was introduced at the same time as the naval medal. It covered the period 1793 to 1814, and there were 29 clasps. One of these

[1] The Regiment was disbanded in 1819.

medals, received from the same donor, has the clasps " Fort Detroit " and " Chateauguay "—actions fought in the American War in August, 1812, and 26th October, 1813, respectively.

Dettingen Relics

Two interesting relics of the battle of Dettingen (27th June, 1743) are back in the Museum. These are a pair of brass kettle-drums captured from a French Cavalry regiment by General Ligoniers' Regiment of Horse—late the 7th Dragoon Guards, now the 4th/7th Royal Dragoon Guards—lent by the officers of that regiment; also a Squadron Standard of the 8th, or Black Horse—later the 7th Dragoon Guards. This is believed to be the oldest cavalry Standard in existence, and it was carried at the battle when the regiment was commanded by General Ligonier. It is lent by Colonel H. S. C. Richardson.

Air Section

An accession to the modern and scientific part of the Museum is a scale model of the first gas turbine jet-propelled aircraft to fly successfully. This was the Gloster-Whittle aircraft, flown by P. E. G. Sayers, O.B.E. The model has been given by the Gloster Aircraft Company, Ltd.

Pictures

The Institution's vast collection of pictures has been examined in detail. Many have been rearranged and rehung, notably those on the Members' side of the building. In the inner hall will now be found portraits of the first Vice-Patron—the Duke of Wellington; the first Naval President—Admiral Lord de Saumarez; the first Military President—General Lord Hill; and the first Chairman of the Council—Major-General Sir Howard Douglas, Bart.

On the stairs, from the ground to the first floor, the somewhat drab engravings which used to be there have been replaced by colourful marine paintings in oils by Butterworth. Above these, on the first-floor landings, are the four new paintings by the 1939-45 War-artists allotted to the Institution. These are :—

1. " Convoy," by Norman Wilkinson.
2. Portraits of two W.A.A.F.s in an operations room, by Dame Laura Knight.
3. Portrait of a bearded Commander R.N. of the 1939-45 War, by William Dring.
4. Portrait of a boat's crew Wren, by the same artist.

In order to complete the representation of the womens' Services, the Institution needs a suitable picture of an A.T.S. type.

For the most part, pictures on the upper stairs, landings and Member's rooms have required little rearrangement, and the oil paintings are in very good order.

A considerable number of pictures, for which there is no hanging space, have been lent to newly-formed messes.

Visitors

Despite the natural effects of the aftermath of the War, the R.U.S. Museum continues to be one of London's most popular sights, while scholastic and municipal bodies increasingly recognize its educational value.

During the visit of the U.S.N. training squadron to Portsmouth, over a thousand American officers—mostly Midshipmen—and enlisted men were admitted free.

THE INTERNATIONAL SITUATION

THE DIVISION OF EUROPE

THE international kaleidoscope has been subjected to much twisting and turning since the War in the hope that it will make a pattern of beautiful colours. Unfortunately it seems now to have stuck with its component parts in a particularly ugly design.

The abortive meeting of Foreign Ministers in Moscow, dealt with in this section of the May Journal, at least had the effect of clarifying the political line-up of the European nations. This could only be summarized as thoroughly uncompromising and the outlook for the next meeting, to be held in London next November, seemed anything but auspicious.

Then Mr. Marshall, speaking at Harvard University on 5th June, revived hope that some basis for common outlook and action might be found when he called on the European nations to unite in planning their economic rehabilitation, and indicated that American assistance would be forthcoming if a number of European countries were to agree to a joint programme of reconstruction. In making this offer, he emphasized that the policy of the United States is not directed against any country or doctrine, but against " hunger, poverty, desperation and chaos."

THE MARSHALL OFFER

The British Foreign Secretary, Mr. Bevin, warmly welcomed " the inspiring lead given to us and the peoples of Europe by Mr. Marshall." On 17th June he arrived in Paris to consult the French Government on the best means of following up the American offer. It was decided at once that it should be proposed to M. Molotov that the three Foreign Ministers should meet on the 23rd to discuss the problems as a whole. The Soviet Minister arrived in Paris on 26th June and discussions opened the next day at the *Quai d'Orsay*.

On 2nd July the Conference broke down. Yet again the Soviet Minister said " No " to proposals which might have brought the nations together in the interests of all. Mr. Bevin, having listened to M. Molotov's destructive criticism, said it was " based on a complete travesty of the facts and on a complete misrepresentation of everything the British Government had submitted at the meeting." " I suppose," he added, " the method is to go on repeating these misrepresentations in the hope that someone will at last believe them." M. Molotov had even threatened that if Britain and France continued with their plan to further Mr. Marshall's proposal, they would " have to face grave consequences." To this Mr. Bevin retorted, "My country has faced grave consequences and threats before, but it is not the sort of prospect which will deter us from doing what we consider our duty."

THE ECONOMIC CONFERENCE

The next day Mr. Bevin and M. Bidault issued a joint statement which announced that the British and French Governments had decided to invite all European States (with the temporary exception of Spain) who might wish to participate in framing a reply to Mr. Marshall's proposal to collaborate with them. A new Conference would open in Paris on 12th July.

It was with considerable interest that the replies from the various nations were awaited. In due course the representatives of sixteen countries assembled for the Conference. These were, in addition to Great Britain and France—Austria, Belgium, Denmark, Eire, Greece, Iceland, Italy, Luxembourg, the Netherlands,

Norway, Portugal, Sweden, Switzerland, and Turkey. Countries whose Governments refused the Anglo-French invitation were—Albania, Bulgaria, Czechoslovakia, Finland, Hungary, Poland, Rumania, Yugoslavia. Spain was not invited.

The influence of Soviet Russia in these refusals was quite obvious, but in no instance more so than in that of Czechoslovakia, who had accepted the Anglo-French invitation when her Prime Minister, M. Gothwald, was invited to Moscow. Following on his visit there, the acceptance was withdrawn. This *volte face* was by no means universally popular in his country.

All this might be regarded as relating primarily to the political complexion of the existing Governments in Europe and their resulting economic policies, as perhaps it does for the time being. But the consequent line-up of the nations, both politically and economically, has now assumed such a marked geographical pattern that it is impossible to ignore its potential military significance. This is shown very clearly in the accompanying sketch map.

The Soviet press and radio are continually harping on the creation of a Western *bloc*, which they allege is linked to and supported by the United States. If this is coming about, it is directly due to the political, and now the economic "iron curtain" created by Soviet Russia's rulers, not only—as they may see it—to defend their ideologies; but now—as the rest of the World must see it—to imprison her satellites.

PROPOSALS FOR AN INTERNATIONAL POLICE FORCE

On 30th June, the United Nations' Military Staff Committee received the estimates put forward by France, the United States, and Great Britain and China jointly, of the International Police Force to be available to the United Nations.

No general agreement by the Committee had been reached, so the proposals of the principal nations were put forward separately. The British proposals were supported by China. Soviet Russia refused to present any proposals pending action by the Security Council on the first report of the Military Staff Committee. That report was issued on 3rd May and dealt with such general matters as the purpose of armed forces; their employment against aggression; the degree of readiness of an international force; the location of the national contingents; strategic direction and command. It showed considerable divergence of views, especially on the part of Russia.

The respective proposals now made for the composition of an international force are as follows:—

GROUND FORCES

	French	*Anglo-Chinese*	*U.S.*
Divisions	16*	8–12	20

*—10 motorized or mountain, 3 armoured, 3 airborne.

NAVAL FORCES

	French	*Anglo-Chinese*	*U.S.*
Battleships	3	2	3
Aircraft Carriers	6	4	6
Cruisers	9	6	15
Destroyers	18–24	24	84
Escort Vessels	30	48	—
Minesweepers	30	24	—
Submarines	12	12	—
Assault craft for number of divisions shown	1	2–3	6

AIR FORCES

	French	*Anglo-Chinese*	*U.S.*
Bombers	775	600	1,250
Fighters	300	400	2,500
Reconnaissance	200	—	—
Miscellaneous	—	200	300
Total ...	1,275	1,200	4,050

It will be noted that the United States proposes a much greater force of all arms than the other three nations, especially as regards the strength of ground forces, the number of cruisers and destroyers, and of bombers and fighters.

CORRESPONDENCE

(Correspondence is invited on subjects which have been dealt with in the JOURNAL, *or which are of general interest to the Services. Correspondents are requested to put their views as concise as possible, but publication of letters will be dependent on the space available in each number of the* JOURNAL.—EDITOR)

TANK DEVELOPMENT AND PRODUCTION 1939-45

To the Editor of the R.U.S.I. Journal.

SIR,—In the May number of the JOURNAL an article by Lieut.-Colonel Carver, under the above heading, contained certain statements and criticisms. The author is quite right when he points out in his concluding paragraph that we fell grievously behind other nations in this subject, due to financial stringency between the two wars, and also that tank development and production suffered from the fact that there were so many other calls on our limited industrial capacity. As a result of both these facts the troops were, on the whole, not well equipped with tanks during the late war. He is also right when he says that I was not responsible for the material side of tank production during the war, though I naturally knew the whole position in some detail, and Lieut.-Colonel Carver is not quite fair to the technicians in some of his statements. Of course some bad mistakes were made at times on the technical side and this was maddening from our point of view on the fighting side, but we must remember that the Germans had a number of fully-equipped armoured formations several years before the War when we had hardly made a start. With this handicap it was bound to take us some time to catch up. I will take the main criticisms in turn.

Firstly, it was the General Staff at the War Office that decided under the circumstances not to interrupt the production of tanks with 2-pdr. guns at the start of the War, though they were of course desperately anxious to introduce the 6-pdr. gun as soon as possible. I do not think that Lieut.-Colonel Carver would have made any different decision if the responsibility had been his.

Secondly, although I naturally discussed such matters with nearly every unit, I never met one that did not agree that the Cromwell was handier and more reliable than the Sherman. Inability to obtain the necessary engines was the reason for the failure of some of the early models of this class.

Thirdly, the Churchill tank was designed in 1939 to take a 6-pdr. gun. Nothing more powerful than this gun appeared in any German tank for two years. After it had overcome some teething troubles, it was a very reliable and popular tank and was used for many auxiliary purposes. It was a valuable first step in producing a heavy infantry tank. It could not of course stand comparison with the German Tiger tank which appeared in 1943.

Finally we come to the question of the lack of any heavy tanks for our use in the later stages of the war. Lieut.-Colonel Carver mentions the Black Prince and I agree with him that this design was not what we wanted. I never suggested that it was. He also mentions another type and because the pilot model was not constructed till a very late stage he states, quite rightly, that it was then too late to produce this model in time for the War. The point however which he has missed is as follows. In 1942 H.Q. Armoured Forces were pressing the War Office to produce the next model of heavy infantry tank to replace the Churchill. It was clear that this should be a long way ahead in gun power and armour of the Tigers which we knew that the Germans were constructing. The Director of the R.A.C. at the War Office was in entire agreement. Unfortunately the 8th Army had expressed the view from their desert experience that they did not require a special heavy tank in addition to the Cruiser. This carried weight with the General Staff at the War Office, and as a result no pressure was put on this work.

At that time we possessed the guns, the armour and the components, and in the two years that would have been available we could quite easily have used them to produce a limited number of slow and simple infantry tanks powerful enough to blow the Tigers off the battlefield and to clear the way for our mobile forces. Even fifty of these tanks would have given us an immediate success at Caen.

G. Le Q. MARTEL,
Lieut.-General.

14th July, 1947.

FUTURE NEEDS

In his lecture on "The 21st (British) Army Group in the Campaign in North-West Europe, 1944-45," published in the JOURNAL for November, 1945, on page 448, Field Marshal Sir Bernard L. (now Lord) Montgomery, alluding to the part played by the Royal Armoured Corps, said :—

> "The outstanding point which emerges once more is that we require only two basic types of tank—the capital tank (for fighting) and the light tank (for reconnaissance). The capital tank must be a weapon of universal application, suitable not only for working with the infantry in the attack and in the dog-fight battle, but also capable of operating in the spearheads of the armoured division in pursuit. I am convinced, as a result of experience from Alamein to the Baltic, that it is fundamentally unsound to aim at producing one type of tank for co-operation with the infantry and another for the armoured division. We require *one* tank which will do both jobs. I have learnt that the ubiquitous use of armour is a great battle-winning factor."

"PROFESSIONAL OFFICERS," R.N.

To the Editor of the R.U.S.I. Journal.

SIR,—May I be allowed to correct a misapprehension arising from the Editor's Note at the foot of page 294 of the May issue of the JOURNAL. The reference to "professional officers" in the Navy Estimates, in connection with selection from the Lower Deck, clearly refers to members of the Professions, i.e., doctors, dentists, chaplains, schoolmasters (Instructor Officers), and not to Specialist Officers, such as Gunnery, Communications, etc.

J. N. YORKE,
Commander.

(NOTE.—Our correspondent is right in his interpretation of this novel appellation—EDITOR.)

GENERAL SERVICE NOTES

CHIEF OF COMBINED OPERATIONS STAFF

Major-General R. E. Laycock, C.B., D.S.O., Chief of Combined Operations Staff, vacated that appointment on 1st July and was succeeded by Major-General G. E. Wildman-Lushington, C.B., C.B.E., Royal Marines.

MILITARY COLLEGE OF SCIENCE ADVISORY COUNCIL

The War Office has announced the appointment of an Advisory Council for the Military College of Science under the Chairmanship of Sir Henry Tizard, K.C.B., A.F.C., F.R.S. (Chairman of the Defence Research Policy Committee). The members are :—

Sir Henry Tizard, Chairman.
Professor J. F. Baker, Cambridge University.
Sir James Chadwick, Liverpool University.
Professor R. A. Peters, Oxford University.
Professor E. K. Rideal, Royal Institution.
Dr. A. E. Trueman, University Grants Committee.
Sir Ronald Weeks, Messrs. Vickers Armstrong, Ltd.

Official Members :—

Lieut.-General Sir Sidney C. Kirkman.
Dr. O. H. Wansbrough-Jones, Scientific Adviser to the Army Council.
Lieut.-General F. Wrisberg, Ministry of Supply.
Secretary : Mr. E. K. Stopford, Registrar, Military College of Science.

The Council will advise the War Office on the best means whereby the Military College of Science can carry out the scientific and technical education of Army officers. It will maintain liaison with Universities and professional institutes, first to supplement the resources of the College by University and professional courses, and secondly to keep scientific development in the Army abreast of similar development in the outside world.

NORWAY CAMPAIGN, 1940, DESPATCH

A Despatch submitted to the Lords Commissioners of the Admiralty on 17th July, 1940, by Admiral of the Fleet the Earl of Cork and Orrery, G.C.B., G.C.V.O., Flag Officer, Narvik, was published in the *London Gazette* of 10th July, 1947.

The Despatch deals with the combined operations in the Narvik area between 14th April and 8th June, 1940.

Lord Cork and Orrery was Commander-in-Chief of the Allied forces.

Appended to his Despatch are two Reports submitted to the Secretary of State for War : the first, dated 15th May, 1940, by Major-General P. J. Mackesy, C.B., D.S.O., M.C., and the second, dated 19th June, by Lieut.-General C. J. E. Auchinleck, C.B., C.S.I., D.S.O., O.B.E. These Reports deal with the operations of the land forces, in command of which were Major-General Mackesy until 13th May and Lieut.-General Auchinleck from that date onwards.

The remarkable conditions in which this Campaign was launched are now made known in the Admiral of the Fleet's Despatch when, referring to his first meeting with the G.O.C. troops on 15th April, 1940, at the advanced base in Bygden Fiord, he reports :— "I . . . was astonished to hear that not only was his force embarked as for a peaceful landing and consequently was unready for immediate operations, but that the orders he had received, and given to him just prior to sailing, ruled out any idea of attempting an opposed landing. Thus the General and myself left the U.K. with diametrically opposite views as to what was required."

MISCELLANEOUS

CADET FORCES.—On 2nd July, in the House of Commons and in a statement to the Press, the Minister of Defence, Mr. A. V. Alexander, emphasized the Government's intention to foster and encourage the Cadet Forces of the Navy, Army and Air Force.

He appealed for recruits for the Cadet Forces and for adults to act as instructors. The present strength of the Sea Cadet Corps was about 30,000; that of the Army Cadet Force 112,000; and that of the Air Training Corps 46,000. The Minister said he would like to see these figures rise to 50,000, 162,000 and 76,000 respectively.

Anomalies were being removed; cadets would have free transport to annual camps, and officers would be paid while in full-time employment at courses or during camps. Other services were under examination.

ROYAL MARINES AND ARGYLL AND SUTHERLAND HIGHLANDERS.—During the 1939–45 War the Royal Marines were closely associated with the Argyll and Sutherland Highlanders both in the European and Far Eastern theatres. From 1940 to 1942 the 8th Bn. Argyll and Sutherland Highlanders was brigaded within the Royal Marine Division. In January, 1942, the R.M. survivors from H.M. Ships "Repulse" and "Prince of Wales" were amalgamated with the 2nd Bn. Argyll and Sutherland Highlanders and fought in the defence of Singapore. This unit was nicknamed "The Plymouth Argylls." In addition, the 7th Bn. Royal Marines fought in a brigade commanded by an officer from the Argyll and Sutherland Highlanders in Sicily, and several Argyll and Sutherland officers served in R.M. Commandos. As a result of these close connections during the War the Royal Marines have formed an association with the Argyll and Sutherland Highlanders similar to that already in existence between the Corps and The East Surrey Regiment.

ATOMIC ENERGY FACTORY.—A training school for boys and girls of fifteen years and over is to be opened this month (August) by the Ministry of Supply at the Government Atomic Energy Factory at Springfields, near Preston, Lancashire. The training school will give boys and girls, who have studied chemistry at school, a three months course in the chemical methods to be used at the factory. On the successful completion of the course, students will be given appointments on the factory staff.

AUSTRALIA

DEFENCE POLICY

The defence policy of Australia was described in the House of Representatives at Canberra on 4th June by the Minister of Defence, Mr. Dedman.

In the next five years the strength of the three Fighting Services will be built up to 484,000 for the permanent forces and 50,000 citizen forces for the Army and Air Force.

Compulsory training for national defence has been abandoned and recruitment will be voluntary.

Navy.—Within the next five years it is aimed to have 26 ships in commission and 79 in reserve. The ships in commission will include two light aircraft-carriers, two cruisers and six destroyers, besides smaller craft. The ships in reserve will include one cruiser and two destroyers.

It is intended to establish a naval base at Manus Island, in the Admiralty Group, to take the place of the present New Guinea base at Dreger Harbour, and the Government would welcome arrangements with the United States Government for its joint use on the principle of reciprocity.

Army.—The permanent forces of the Army, with a strength of 19,000, will comprise a field force of one independent brigade group, including three infantry battalions, an armoured unit, and the necessary supporting units; fixed defence troops, base and administrative troops, and training units; and cadres for instructional, administrative, and other duties with the citizen forces. Initially all permanent field force units will be

stationed in Japan, in place of units of the Australian component of the B.C.O.F. The Royal Military College at Duntroon will be expanded for the training of officers; officers' training corps will be created at universities and teachers' colleges, and school cadet corps will be expanded.

Air Force.—The permanent Air Force will comprise 11,930 men, the citizen air force 190, and civilians 500. The total of 16 squadrons proposed will have a strength of 144 aircraft backed by 439 reserve operational aircraft and 698 for training and miscellaneous duties. The static home defence organization will have seven squadrons and associated units. Task force units will be trained in exercises with the Army.

Research and Development.—A certain sum of money per annum is to be provided for research and development, including the development of the guided weapons project in Central Australia.

Empire Co-operation.—The United Kingdom and Commonwealth Governments were in the closest consultation on the best way in which Australia could help with scientific developments affecting defence. The programme gave practical effect to Mr. Chifley's promise that Australia would take a greater share of the burden of Empire defence so long carried by the United Kingdom. Provision was being made for a joint Empire intelligence organization in the Pacific, and Australia had proposed other machinery for co-operation in the Pacific.

INDIA

The Armed Forces

During the past quarter, political developments in India have been maturing rapidly. What was known as British India is being divided into two States with Dominion status. The predominantly Hindu-populated area is to be one Dominion, with the title of Union of India; the predominantly Muslim-populated areas are to become another Dominion named Pakistan. British paramountcy over the independent Indian States will lapse and these States will be free agents to determine their future. The British Government is not encouraging them to set up as sovereign States; they advise joining up either with the Union of India or Pakistan, and presume that geographical considerations will play an important part in the States' decisions.

A "Partition Council" met at Delhi on 30th June under the Chairmanship of the Viceroy to consider the reconstitution of the armed forces of India. It was decided that the following principles should govern such reconstitution:—

1. The Union of India and Pakistan should each have within their own territories forces which—

(*a*) are, with effect from 15th August, 1947, under their own operational control;

(*b*) are, on 15th August, predominantly composed of non-Muslims and Muslims respectively, and

(*c*) are, as soon as possible after 15th August, reconstituted predominantly on a territorial basis.

2. The heads of the Navy, Army and Air Force of the Union of India and of Pakistan should be selected forthwith and be ready to take over command by 15th August.

3. All the existing Indian armed forces will be under a single administrative control until they have been finally sorted out into two distinct forces and until the two governments are in a position to pay, feed, clothe and equip their respective forces.

4. Accordingly the Indian armed forces will for the present remain under the administrative control of the present Commander-in-Chief in India, who, in his turn,

will be under the Joint Defence Council. This will consist of the Governor-General, the two Defence Ministers, and the Commander-in-Chief, India.*

5. The present Commander-in-Chief will be entitled Supreme Commander with effect from 15th August until his work is completed. He will have no responsibility for law and order, nor will he have operational control over any units save those in transit from one Dominion to another. Nor will he have any power to move troops within the borders of either Dominion.

6. The partition of the armed forces will proceed by stages. First there will be a more or less rough and ready division of the existing forces on a communal basis. Then the units themselves will be combed out on the basis of voluntary transfer. Every effort should be made to complete the reconstitution of units and to provide each Dominion with its own administrative and maintenance services by 1st April, 1948.

7. As soon as central administrative control can be dispensed with, the two governments will be free to reorganize their armed forces as they think fit.

On the transfer of power to the two new Dominions on 15th August, the withdrawal of British armed forces will be started immediately and will be carried out as rapidly as shipping permits. It will probably be completed by the end of the year.

Commanders

Names of the commanders of the armed forces chosen by the Governments of India and Pakistan were announced at Delhi on 30th July. Captain J. T. S. Hall, R.I.N., will command the naval forces of India, and Commodore J. W. Jefford, R.I.N., those of Pakistan, both with the rank of Rear-Admiral. Lieutenant-General Sir Rob Lockhart will command the army of India, and Lieutenant-General Sir Frank Messervy that of Pakistan, both with the rank of General. Air Marshal Sir Thomas Elmhirst will command the air forces of India with the rank of Air Marshal, and Air Vice-Marshal A. L. A. Perry-Keene those of Pakistan, in the rank of Air Vice-Marshal.

FOREIGN

CHINA

Joint Service Education.—It is reported that in order to meet the requirements for National Defence, the National Defence Ministry will reform the military education courses in China. Joint education of land, sea, air and combined service will be given to students so that they will have the spirit of co-operation and be capable of command and staff duties in joint warfare. The duration of the course of education will be four years, of which the first two years are for general education and the last two years for specialized training. The qualifications for entering the course will probably be : (*a*) Age 18 to 22 ; (*b*) Graduation from Higher Middle Schools or equivalent ; (*c*) Citizenship of the Republic of China ; (*d*) Good character, loyalty and physical perfection.

*On 10th July it was announced that Lord Mountbatten would become Governor-General of the Union of India and Mr. Jinnah Governor-General of Pakistan. Lord Mountbatten would be Chairman of the Joint Defence Council.

NAVY NOTES

GREAT BRITAIN

H.M. The King

The King and Queen and the Princesses Elizabeth and Margaret landed at Portsmouth from H.M.S. "Vanguard," Captain W. G. Agnew, R.N., on 12th May on the conclusion of their tour of the Union of South Africa and the Rhodesias. They had arrived in Portsmouth Harbour on the previous evening, having been escorted by the cruisers "Diadem" and "Cleopatra." The Duke of Gloucester, as Master of Trinity House, embarked in the Trinity House yacht "Patricia," which met H.M.S. "Vanguard" at the Outer Spit Buoy and escorted her into harbour. In a message to the officers and ship's company, the King thanked them for making the outward and homeward voyages so pleasant, and granted them three days' extra leave. "The British Navy," he said, "has always stood high in the estimation of the peoples of the world, and never higher than it does now. I have every confidence that its good name and high traditions are safe in the hands of those who serve in it to-day."

The following officers have been appointed as Naval Aides-de-Camp to the King from 2nd April, 1947, in place of the officers stated :—

Captain (E) C. J. B. Colhurst, in succession to Captain (E) H. S. Roome, promoted to Flag rank.

Captain (E) J. Breaks, in succession to Captain (E) C. J. Proctor, placed on the Retired List.

Surgeon Captain H. O. Martin has been appointed an Honorary Physician to the King from 20th December, 1946, in place of Surgeon Captain F. L. Cassidi, placed on the Retired List.

Board of Admiralty

The King has been pleased, by Letters Patent under the Great Seal, bearing date 25th April, 1947, to appoint the following to be Commissioners for Executing the Office of Lord High Admiral of the United Kingdom :—

The Right Hon. George Henry, Viscount Hall.
Admiral Sir John H. D. Cunningham, G.C.B., M.V.O.
Admiral Sir Arthur J. Power, G.B.E., K.C.B., C.V.O.
Vice-Admiral Charles S. Daniel, C.B., C.B.E., D.S.O.
Vice-Admiral Sir Douglas B. Fisher, K.C.B., K.B.E.
Vice-Admiral Sir Philip L. Vian, K.C.B., K.B.E., D.S.O.
Vice-Admiral Sir Rhoderick R. McGrigor, K.C.B., D.S.O.
Rear-Admiral Geoffrey N. Oliver, C.B., D.S.O.
John Dugdale, Esq.
Walter James Edwards, Esq.
John Gerald Lang, Esq., C.B.

The First Lord, Viscount Hall, accompanied by the Naval Secretary, Rear-Admiral M. J. Mansergh, arrived at Malta on 10th April on a four days' visit to the Dockyard, naval establishments and ships.

The First Sea Lord, Admiral Sir John Cunningham, in the aircraft carrier "Vengeance," Captain J. H. F. Crombie, R.N., arrived at Oslo on 5th June, escorted by the destroyers "Sluys," Commander E. T. Larken, and "Cadiz," Acting Commander R. de L. Brooke. Later in the month, the First Sea Lord visited Kristiansand, Bergen, Trondheim, Mosjoen, Mo, Bodo and Tromso, before returning to Rosyth.

Flag Appointments

Admiralty.—It was announced on 6th May that the King had approved the following appointments :—

Vice-Admiral Sir Philip L. Vian to be a Lord Commissioner of the Admiralty and Fifth Sea Lord, in continuation, and to be Deputy Chief of the Naval Staff (Air).

Rear-Admiral Geoffrey N. Oliver to be a Lord Commissioner of the Admiralty, in succession to Rear-Admiral Robert D. Oliver, and to be Assistant Chief of the Naval Staff, in continuation.

The separate appointment of Deputy Chief of Naval Staff has now lapsed. Vice-Admiral Vian has assumed the additional duties of Deputy Chief of Naval Staff in so far as they affect the Naval Air Service. The remaining duties of Deputy Chief of Naval Staff are vested in the Assistant Chief of Naval Staff, who has now become a Lord Commissioner. The effect of these changes is to make a reduction of one Flag Officer in the higher direction of the Naval Staff.

PORTSMOUTH.—On 15th May, Admiral Lord Fraser of North Cape succeeded Admiral Sir Geoffrey Layton as Commander-in-Chief, Portsmouth.

The following appointments were announced on 30th May :—

Rear-Admiral W. G. Agnew, for duty inside the Admiralty as Director of Personal Services and Deputy Chief of Naval Personnel, in succession to Rear-Admiral M. M. Denny (appointment to take effect in August, 1947).

Rear-Admiral P. K. Enright to be Flag Officer, Training Battleships, in succession to Rear-Admiral H. Hickling (August, 1947).

Rear-Admiral R. D. Oliver to be Flag Officer Commanding Fifth Cruiser Squadron, in succession to Rear-Admiral C. H. L. Woodhouse (September, 1947).

Rear-Admiral M. M. Denny to be Flag Officer (Destroyers), Mediterranean Fleet, in succession to Rear-Admiral E. D. B. McCarthy (end of October, 1947).

It was announced on 26th June that the King had approved the following appointments :—

Admiral Sir Robert L. Burnett to be Commander-in-Chief, Plymouth, in succession to Admiral Sir Henry D. Pridham-Wippell, the appointment to take effect on 1st December, 1947.

Vice-Admiral Sir Rhoderick R. McGrigor to be Commander-in-Chief, Home Fleet, in succession to Admiral Sir E. Neville Syfret, the appointment to take effect on 7th January, 1948.

Vice-Admiral Sir John H. Edelsten to be a Lord Commissioner of the Admiralty and Vice-Chief of the Naval Staff, in succession to Vice-Admiral Sir Rhoderick R. McGrigor, the appointment to take effect on 13th October, 1947.

The following appointment has also been approved and was announced on 26th June :—

Vice-Admiral W. R. Patterson to be Admiral Commanding Reserves, in succession to Vice-Admiral Sir Charles E. Morgan, the appointment to take effect on 13th October, 1947.

The approval of the following appointments was announced on 27th July :—

Rear-Admiral H. R. G. Kinahan, to be Senior Naval Member and Vice President (Naval) to the Ordnance Board, in succession to Rear-Admiral A. J. L. Phillips, D.S.O., as from 15th October, 1947.

Rear-Admiral R. M. Servaes, to be Flag Officer Commanding Reserve Fleet in succession to Rear-Admiral L. H. Ashmore, C.B., D.S.O., as from 17th September, 1947.

Rear-Admiral C. E. Lambe, to be Flag Officer Flying Training in succession to Rear-Admiral the Mackintosh of Mackintosh, C.B., D.S.O., D.S.C., as from September, 1947.

ADMIRALTY APPOINTMENTS

Captain C. S. B. Swinley was appointed Chief of Naval Information, to date 25th April, in succession to Captain C. A. H. Brooking, who reverted to the Retired List.

Captain R. M. Dick succeeded Captain C. L. Robertson as Director of Tactical and Staff Duties on 6th May. Captain Robertson has been appointed Commodore-in-Charge, Hong Kong.

Captain A. C. G. Ermen was appointed for duty at the Admiralty from 15th May, before succeeding Captain K. A. Short as Deputy Director (Training) in the Department of Naval Air Organisation and Training.

Captain J. H. Allison has been appointed Director of Boom Defence, in succession to Captain G. C. Bannister, from 16th July.

Captain D. H. Fuller joined the Admiralty staff on 10th July, before becoming Assistant Director of Underwater Weapons (Torpedo), in succession to Captain R. C. Boyle.

Rear-Admiral P. Ruck-Keene, C.B.E., D.S.O., was appointed Director of Naval Training in succession to Rear-Admiral J. W. Durnford, C.B., as from 8th August.

Retirements and Promotions

On 3rd May, the Admiralty announced that Vice-Admiral Sir Victor A. C. Crutchley, V.C., had been placed on the Retired List. In consequence—

Rear-Admiral R. H. Portal was promoted to Vice-Admiral;

Rear-Admiral J. W. Rivett-Carnac (Retired) was promoted to Vice-Admiral (Retired);

Rear-Admiral J. W. A. Waller was placed on the Retired List and promoted to Vice-Admiral (all to date from 3rd May).

On 16th May, the Admiralty announced that Admiral Sir Geoffrey Layton was to be placed on the Retired List at his own request in order to facilitate the promotion of junior officers. In consequence—

Vice-Admiral (Acting Admiral) Sir Louis H. K. Hamilton was promoted to Admiral;

Vice-Admiral Sir Arthur F. E. Palliser was promoted to Admiral;

Vice-Admiral Sir Irvine G. Glennie (Retired) was promoted to Admiral (Retired); and

Rear-Admiral E. R. Archer was promoted to Vice Admiral (all to date 16th May).

On promotion, Admiral Hamilton was reappointed for duty with the Government of the Commonwealth of Australia as First Naval Member of the Commonwealth Naval Board; Admiral Palliser was reappointed Commander-in-Chief, East Indies; and Vice-Admiral Archer was reappointed Flag Officer, Gibraltar.

The Admiralty announced that the following promotions and retirements have been approved, to date 8th July:—

To be promoted to Rear-Admiral:—

Captain (Commodore, 1st Class) G. Grantham, Chief of Staff to the Commander-in-Chief, Mediterranean.

Captain (Acting Rear-Admiral) C. E. Lambe, formerly Director of Planning at the Admiralty.

Captain (Acting Rear-Admiral) The Mackintosh of Mackintosh, Flag Officer, Flying Training.

Captain B. B. Schofield, formerly commanding H.M.S. "King George V."

Captain (Commodore, 2nd Class) B. C. B. Brooke, Commodore, R.N. Barracks, Chatham.

Captain H. G. Norman, a member of the Admiralty Man-power Committee.

To be placed on the Retired List in the rank of Captain:—

Captain G. T. Philip.

Captain (Commodore, 2nd Class) J. T. Borrett, Commodore of H.M. Dockyard, Sheerness.

Captain F. J. Wylie.

The following have been promoted to Rear-Admiral (E), to date 2nd April, 1947:—

Captain (E) H. S. Roome.

Captain (E) T. H. Simpson.

HALF-YEARLY LIST.—The following promotions have been made, to date 30th June, 1947 :—

Commander to Captain.—E. P. Hinton, J. A. W. Tothill, P. D. H. R. Pelly, T. V. Briggs, A. C. A. C. Duckworth, J. Holmes, R. G. Tosswill, H. F. Bone, G. E. Fardell, A. S. Bolt, W. G. Crawford, D. McI. Russell, M. S. Townsend, N. A. Copeman, C. L. G. Evans, C. D. Maud, V. C. Begg.

Lieutenant-Commander to Commander.—E. A. Nicholson, W. G. C. Elder, P. R. Ward, D. S. Johnston, V. C. Grenfell, J. H. Crawford, I. G. Steel, J. M. Alliston, H. H. H. Mulleneux, J. G. B. Cooke, J. L. Blackham, D. F. Townsend, C. G. Walker, C. E. Pollock, P. E. Fanshawe, R. de L. Brooke, C. E. A. Cree, B. S. Pemberton, R. G. Jenkins, R. W. Briggs, W. Scott, D. H. R. Bromley, P. J. Norton, E. E. Jones, M. G. Greig, R. Hart, J. J. E. Farnol, J. A. C. Henley, L. E. D. Walthall, M. C. Giles, G. D. Pound, I. L. M. McGeoch, J. Mayling, P. G. C. Dickens, S. J. Dallaway.

Commander (E) to Captain (E).—F. G. Spratt Bowring, E. F. Anderton, K. J. R. Langmaid, G. L. Baily, W. K. Weston.

Lieutenant-Commander (E) to Commander (E).—A. E. Hargreave, R. H. S. Clark, D. A. W. Sandell, R. P. Pratt, C. W. Gordon Ham, W. A. Haynes, F. C. Burge, A. H. Bott, E. J. Murray, D. G. Thompson, E. H. Player, F. J. S. Corney, R. H. Tribe, A. F. Turner, G. W. Gay.

HONOURS AND AWARDS

BIRTHDAY HONOURS

The following were included in the honours conferred on the occasion of the official celebration of the King's Birthday on 12th June :—

G.C.B. (Military).—Admiral Sir Algernon U. Willis.

K.C.B.(Military).—Vice-Admiral Wilfred R. Patterson.
Vice-Admiral Sir Cecil P. Talbot (Retired).
Surgeon Vice-Admiral Henry St. C. Colson.

K.C.B.(Civil).—John Gerald Lang, Permanent Secretary, Admiralty.

C.B.(Military).—Rear-Admiral A. E. M. B. Cunninghame-Graham, Rear-Admiral H. T. England (Retired), Rear-Admiral G. B. Middleton, Rear-Admiral (E) C. H. Nicholson, Rear-Admiral R. M. Servaes, Rear-Admiral G. L. Warren (Retired), the Ven. Archdeacon J. K. Wilson, Chaplain of the Fleet, Captain C. R. N. Winn, R.N.V.R.

G.C.V.O.—Admiral Sir Dudley B. N. North.

K.C.V.O.—Admiral Sir Aubrey C. H. Smith.
Surgeon Rear-Admiral Henry E. Y. White.

C.V.O.—Commander the Hon. Humphrey Legge.

D.B.E. (Military).—Miss Matilda Goodrich, Matron-in-Chief, Queen Alexandra's Royal Naval Nursing Service.

C.B.E. (Military).—The Rev. A. Campsie, Chaplain, R.N., Engineer Captain C. J. Gray, R.N. (Retired), Surgeon Captain R. G. Henderson, R.N.V.R., Captain F. D. Howie, R.N., Captain (S) W. McBride, R.N., Colonel R. H. Quill, R.M.

H.M.S. "VANGUARD"

The King has made promotions in the Royal Victorian Order for the undermentioned officers of H.M.S. "Vanguard" for services in connection with their Majesties' visit to the Union of South Africa, Southern Rhodesia, and other territories in Africa :—

K.C.V.O.—Rear-Admiral William Gladstone Agnew.

C.V.O.—Commander W. J. Lamb, R.N.

OPERATIONS IN JAVA

The King has conferred the C.B.E. (Military Division) on Acting Captain Edward Tyndale Cooper, D.S.O., R.N., for exceptional services as Naval Officer-in-Charge, Batavia, during the British operations in Java after the Japanese surrender.

Personnel

Man-Power Economy.—The Board of Admiralty has appointed a Man-Power Economy Committee, to review the use of man-power in the Royal Navy and the Royal Marines and to recommend measures for retaining fighting efficiency with the greatest possible economy in numbers. The inquiries will cover H.M. ships and establishments and will include all civilians employed on fleet services. The members of the Committee are :—*Chairman*, His Honour Tom Eastham, K.C. (Senior Official Referee, Supreme Court) ; *members*, Mr. J. Green (Director, T. Firth and J. Brown, Limited), Mr. J. C. Little (a Past-President, Amalgamated Engineering Union), Rear-Admiral (S) E. H. Drayson, Captain H. G. Norman, R.N., Mr. J. F. Mountain, Assistant Secretary, Naval Branch ; *Secretary*, Mr. W. B. Callow, Naval Branch.

Anti-Submarine School.—The name of the Joint Anti-Submarine School of the Royal Navy and Royal Air Force, established in January, 1946, at Londonderry, has been changed from H.M.S. " Ferret " to H.M.S. " Sea Eagle."

Officers' Resignations.—Officers who wish to leave the Royal Navy or Royal Marines may apply to resign their Commission or to retire voluntarily, according to the circumstances. Such applications are considered on their merits, and allowed at the discretion of the Admiralty. There is no intention of bringing in any scheme whereby officers may buy themselves out of the Service.

Special Entry Age Limits.—It has been decided to raise the age limits for candidates for Naval Cadetships (special entry) in the Executive, Engineering and Supply Branches by four months, to 17 years 4 months minimum and 18 years 4 months maximum, the change to come into operation with the examination to be held in September, 1947. Candidates for this examination must have been born between 2nd September, 1929, and 1st September, 1930.

Entry to Dartmouth College.—In the House of Commons on 7th May, Mr. Dugdale, Financial Secretary, announced a revised scheme of entry to Dartmouth College. The Admiralty have every reason to be satisfied with the quality of the naval officer produced by the entry of boys at about 13½ years of age and their subsequent education at Dartmouth. " The best tribute to Dartmouth is the distinction with which the product has served the country."

It is felt, however, that the time has come for a change in the present system of entry into the Royal Navy through Dartmouth, which may be regarded as having taken its present form about forty years ago. The new educational system of the Country, designed as it is to ensure that every child has an equal opportunity of securing the best education he is capable of absorbing, makes it possible to afford the opportunity of becoming a naval officer to boys from all classes of the community who possess the qualities of mind and potential leadership required by the Royal Navy.

With this object in view the First Lord has decided to modify the system of entry to provide for candidates to join at about the age of 16 years. Evidence will be required of candidates' educational standard (something approximating to the present school certificate is the standard provisionally in mind) and of their ability to profit by the further education which will be given after entry. The method of selection will also include an interview, the exact scope of which has not yet been determined.

Cadets entering Dartmouth under this scheme will be eligible for the Executive, Engineering and Supply Branches of the Royal Navy. It is contemplated that they should spend five terms at Dartmouth before proceeding to sea. No fees or charges, either for tuition or board and lodging, will be payable in respect of new style Dartmouth Cadets. Entry will be open to candidates of the quality required from whatever schools they come.

The Admiralty intend to continue the system of recruiting officers from the lower deck, and hope that it will be possible to select an overall average of 20 to 25 per cent. of officers in these branches from the lower deck. It is hoped that ultimately the new system

of Dartmouth entry will provide one half of the remainder of the officers required for the Navy, the balance coming from the special entry system at about 18 years of age, which it is also intended to continue. It is not yet possible to fix a date when this new scheme will be introduced, but it is hoped that the first entries will begin in September, 1948.

STENOGRAPHER BRANCH.—An Order in Council on 11th June, published in the *London Gazette* on 13th June, states that the Admiralty consider it necessary to improve the provision of shorthand facilities in the Fleet and in shore establishments by the creation of a new branch in the Royal Navy to be known as the Stenographer Branch. Sanction was given accordingly, the rates of pay for men of the new branch to be in accordance with those sanctioned in Order in Council dated 26th June, 1946.

PLAIN CLOTHES ON LEAVE.—From 30th May, approval was given for plain clothes to be worn on short leave by all ratings except those under training, and by all ratings when on leave over 24 hours. The order applies to the United Kingdom only. It may be applied abroad in the Dominions and Colonies at the discretion of Commanders-in-Chief, but not in foreign countries.

HOME FLEET SUMMER CRUISE

Ships of the Home Fleet have been visiting ports in the United Kingdom during the Summer. Amongst those mentioned in the detailed programme were the battleship " Duke of York " (flag of the Commander-in-Chief) ; the cruisers " Superb," " Sirius," " Diadem," " Dido " and " Cleopatra," the destroyers " St. James," " St. Kitts," " Aisne," " Jutland," " Solebay," " Gabard," " Sluys," " Cadiz," " Myngs " and " Dunkirk " and also the training battleships " Anson " (flag of Rear-Admiral Commanding) and " Howe."

H.M.S. " Sirius " also visited continental ports.

MEDITERRANEAN FLEET'S FIRST SUMMER CRUISE

The Mediterranean Fleet left Malta on 17th July to visit ports in Turkey, Russia, Greece and the Eastern Mediterranean on the first summer cruise, returning to Malta on 23rd August.

The ships included H.M.S. " Liverpool," flying the flag of the Commander-in-Chief—Admiral Sir Algernon U. Willis, G.C.B., K.B.E., D.S.O. ; H.M.S. "Triumph," Flag Officer (Air) Mediterranean—Vice-Admiral Sir Cecil Harcourt, K.C.B., C.B.E. ; H.M.S. " Phoebe," Flag Officer Destroyers—Rear-Admiral E. McCarthy, C.B., D.S.O. ; H.M.S. " Mauritius," Flag Officer First Cruiser Squadron—Rear Admiral R. Symonds-Taylor, D.S.C. Also taking part were H.M. ships " Ocean," " Leander," " Woolwich," " Surprise," " Chequers," " Chaplet," " Cheviot," " Chieftain," " Chariot," " Chevron," " Venus," " Virago," " Haydon," " Talybont," " Stevenstone," " Brissenden," " Mermaid," " Bigbury Bay," " Whitesand Bay," " Protector " and " Dieppe."

Among the places to be visited were Sevastopol, Istanbul, Athens, Nauplia, Heraklion, Melos, Mityleni, Rhodes, Aidepsos, Spetsai, Suda Bay, Vatika Bay, Famagusta, Larnaka, Limassol, Haifa and Jaffa.

ANTI-SUBMARINE EXERCISES

Large scale anti-submarine exercises were carried out in July, in the North Western approaches, under control of the Joint Anti-Submarine School, Londonderry, Northern Ireland and the Flag Officer of Submarines—Vice-Admiral J. M. Mansfield in H.M.S. "Woodbridge Haven."

Forty surface ships and submarines took part with the Royal Air Force aircraft of Coastal Command and naval aircraft from the Royal Naval Air Station at Eglington, Northern Ireland.

WOMEN'S ROYAL NAVAL SERVICE

Miss J. M. Woollcombe, C.B.E., Director of the W.R.N.S., arrived in Malta on 10th April on a six-day visit to units of the Service.

The W.R.N.S. has vacancies for volunteers in the motor transport category. Women between the ages of 17½ and 45 are eligible. Application should be made to an employment exchange or to the Director, W.R.N.S., Queen Anne's Mansions, S.W.1.

Naval War Memorials

In the House of Commons on 21st May, Mr. Dugdale, Financial Secretary, said that proposals were at present under consideration in conjunction with the Imperial War Graves Commission to extend the existing war memorials at Chatham, Portsmouth, and Plymouth to include the names of members of Naval and Marine Services (including the Maritime Regiment) who lost their lives during the 1939-45 War and had no known graves. Further proposals were also under consideration for the erection of three smaller memorials, one at Lee-on-Solent for naval air personnel, one at Liverpool for those from the Merchant Navy who lost their lives while serving in the Royal Navy under the T.124X agreement, and one at Lowestoft for members of the Royal Naval Patrol Service.

On 5th May, Mr. Key, Minister of Works, made a statement on the progress of the Jellicoe and Beatty memorials in Trafalgar Square. He said that the House resolved in 1935 and 1936 that such memorials should be erected, and his predecessors made considerable progress with a scheme incorporating busts of Admirals Lord Jellicoe and Lord Beatty as features of reconstructed fountains in the Square. When work was suspended on the outbreak of war new inner basins of Portland stone had already been erected to the designs of Sir Edwin Lutyens, and shortly after the sculptors, Messrs. Wheeler and McMillan, completed the bronze groups of statuary and the busts, which have since been shown at the Royal Academy. He now proposed to carry the scheme to completion, with one-alteration—to place the busts on pedestals against the North wall of the Square, to which the Royal Fine Art Commission had agreed.

Material

Royal Yacht.—On 15th May, when Admiral Sir Dudley North relinquished the appointment of Admiral of the King's Yachts, H.M.S. " Victoria and Albert " was handed over to the charge of the Commodore, R.N. Barracks, Portsmouth. She will not go to sea again, but by direction of the King the Royal apartments will be maintained for use by members of the Royal Family visiting Portsmouth.

Launches.—The Duchess of Kent named and launched H.M.S. " Centaur," light fleet carrier, on 22nd April at the Musgrave shipyard of Harland and Wolff, Ltd., Belfast. H.M.S. " Albion ", a sister-ship, was launched on 6th May at the Wallsend shipyard of Swan, Hunter and Wigham Richardson, Ltd.

New Submarine.—A new submarine, H.M.S. " Artful," was launched from the yard of Messrs. Scotts Shipbuilding and Engineering Co., Greenock, on May 22nd.

This is the eighteenth submarine of her class; her predecessors included H.M. submarines, " Aurochs," " Aeneas," " Alaric," " Alcide," " Aldernay," and " Affray."

Radar Ship.—H.M.S. " Boxer," laid down by Messrs. Harland and Wolff in July, 1941, has been completed as a radar training ship. She is of 5,650 tons displacement, and has five masts. Some 60 radar sets of all types are carried for instructional purposes.

Cruiser Conversions.—H.M.S. " Devonshire," completed in 1929, has been converted to a training cruiser, and left Devonport at the end of May with 222 Cadets on board, including some from India, Eire and New Zealand. H.M.S. " Hawkins," completed in 1919, has been allocated as a target for bombing experiments by naval airmen.

Floating Dock.—The 50,000-ton Admiralty floating dock from Bombay arrived at Malta on 8th May to replace the 30,000-ton dock which was bombed in June, 1940.

Weather Corvettes.—With reference to the statement in Navy Notes in last quarter's Journal that certain corvettes were being taken over for meteorological work, it was not correct that these vessels were being transferred to the R.A.F. Four ex-" Flower " class are being converted to ocean weather ships for the Meteorological

Office of the Air Ministry. They are "Weather Observer" (ex-"Marguerite,") "Weather Recorder" (ex-"Genista"), "Weather Watcher" (ex-"Snowflake"), "Weather Explorer" (ex-"Thyme"). The prefix "H.M.S." now becomes "O.W.S." (Ocean Weather Ship). The four Captains served with the Royal Navy during the War.

London Gazettes

The following naval despatches have been published during the last Quarter :—

19th June, 1947. The River Plate Battle, 1939, by Rear-Admiral H. H. Harwood, K.C.B., O.B.E., Rear-Admiral Commanding South American Division. No. 37989.

3rd July. First and Second Battles of Narvik, 1940, by Rear-Admiral R. H. C. Hallifax, Rear-Admiral (Destroyers) Home Fleet, and Vice-Admiral W. J. Whitworth, C.B., D.S.O., Vice-Admiral Commanding Battle Cruiser Squadron. No. 38005.

10th July, 1946. Norway Campaign, 1940, by Admiral of the Fleet the Earl of Cork and Orrery, G.C.B., G.C.V.O., Flag Officer, Narvik. No. 38011.

17th July, 1947. The Evacuation from Dunkirk, 1940, by Vice-Admiral Sir Bertram H. Ramsay, K.C.B., M.V.O., Flag Officer Commanding Dover. No. 38017.

24th July, 1947. Fleet Air Arm Operations against Taranto, 1940, by Admiral Sir Andrew Cunningham, G.C.B., D.S.O., Commander-in-Chief, Mediterranean. No. 38023.

31st July, 1947. Battle of Matapan, 1941, by Admiral Sir Andrew B. Cunningham, G.C.B., D.S.O., Commander-in-Chief, Mediterranean. No. 38031.

Losses During the Second World War

An Admiralty *Statement of Losses During the Second World War* was published on 2nd July (H.M.S.O., No. 20-139, price 3s. 6d.). It contains the names or numbers of all warships and auxiliary vessels lost, arranged according to year and class. A statistical summary shows that the total of warships and auxiliary vessels lost was 1,503; of landing ships, 20; and of landing craft and barges, 1,308.

Of the 1,503 warships and auxiliaries, 30 were lost in 1939; 317 in 1940; 284 in 1941; 359 in 1942; 205 in 1943; 208 in 1944; and 100 in 1945. Of the 20 landing ships, one was lost in 1941; one in 1942; three in 1943; twelve in 1944; and three in 1945. Of the 1,308 landing craft, the majority (776) were lost in 1944.

An analysis of causes of loss of the 1,503 war vessels shows that mines destroyed 281; aircraft, 271; submarines, 172; and surface craft, 109. Five were rammed; four destroyed were sunk by shore batteries; and in 116 cases the cause was enemy action, but unknown. Causes of loss, other than enemy action, included 114 vessels wrecked, 89 used as blockships, 85 in collision, 38 by accident, 37 by fire, 28 by our own forces, and 154 unknown.

ROYAL NAVAL VOLUNTEER RESERVE

Formation of Air Squadrons.—The Admiralty have decided to form four R.N.V.R. air squadrons, comprising three fighter squadrons and one fighter anti-submarine squadron. Each will be commanded by a Lieutenant-Commander or Lieutenant-Commander (A), R.N.V.R. who has had front-line squadron flying experience with the R.N., and will be manned by pilots and, in the case of the fighter A/S squadron, observers of the Naval Reserves with similar experience. R.N.V.R. air engineer officers will also be attached to each squadron. A Royal Navy officer, fully qualified as flying instructor, will be appointed as staff officer to the squadron.

The first three R.N.V.R. air squadrons will be located as follows :—

No. 1830 Fighter A/S Squadron, R.N. Air Station, Abbotsinch, for the Glasgow Area.

No. 1831 Fighter Squadron, R.N. Air Station, Stretton, for the Liverpool/Manchester Area.

No. 1832 Fighter Squadron, R.N. Air Station, Culham, for the London/Oxford Area.

The location of the fourth (No. 1833) Squadron will be promulgated later. The squadrons will be equipped initially with Seafire, Firefly and Harvard aircraft. R.N.V.R. personnel will be administered by the Admiral Commanding Reserves, and their training will be under the supervision of the Flag Officer (Air), (Home).

For the present, enrolment will be restricted to pilot and observer officers between the ages of 20 and 30 with front-line flying experience with the Royal Navy. Further information can be obtained from the Admiral Commanding Reserves, Queen Anne's Mansions, S.W.1.

ALLOCATION OF AUXILIARY CRAFT.—Nine motor minesweepers are to be allocated to the various divisions of the R.N.V.R. They will afford more practical training facilities than have previously been possible in Headquarters ships and will enable six or eight officers with thirty men to exercise at sea within 100 miles of their bases.

In addition, the Southampton and Solent Divisions will each be allotted two " B " type Fairmile Motor Launches while the London Division will have a new Harbour Defence Motor Launch.

ROYAL MARINES

NEW ORGANIZATION.—A change in the organization of the Royal Marines in the United Kingdom was announced in the House of Commons on 2nd July by Mr. Dugdale, Financial Secretary. At present there are three Royal Marine groups, at Chatham, Portsmouth and Plymouth, each discharging similar functions. In future, each of these groups would discharge a specific and separate function. A central pay and records system would be located at Chatham. Preliminary recruit training would be at Deal. All training for sea service and similar purposes would be located in the Portsmouth group; and all land service training would be at Plymouth. This change would give greater efficiency in training, and would effect a saving in man-power of approximately 1,000 officers and men.

PERIOD OF SERVICE.—In accordance with the policy that men of all three Services shall in future serve 22 years to qualify for pension, the Royal Marines Act, 1946, has been passed which enables men to engage to complete a total of 22 years service instead of 21 years as hitherto. Royal Marines other ranks permitted to re-engage to complete time for pension after 1st May, 1947, will accordingly re-engage to complete 22 years pensionable service.

From 1st June, recruits are being accepted for the Royal Marines for seven years with the Colours and five years with the Reserve, as an alternative to the present continuous service engagement of twelve years.

DOMINIONS AND COLONIES

AUSTRALIA

Outlining the Australian Government's defence policy in the House of Representatives on 4th June, Mr. Dedman, Minister for Defence, said that within the next five years it was aimed to have 26 ships in commission and 79 in reserve. The former would include two light aircraft carriers, two cruisers, and six destroyers, besides smaller craft. Ships in reserve would include one cruiser and two destroyers. The programme would require 10,450 men in the coming financial year, of whom 4,040 would be sea-going. The Navy vote was the largest of the three Services; in explanation of this, Mr. Dedman said that, in spite of changes and developments in weapons, the British Commonwealth remained a maritime Empire. Authoritative opinion was satisfied that there would be no rapid developments making aircraft carriers, cruisers and destroyers obsolete in the near future. Two destroyers now under construction would be completed, and four more built, giving a continuous building programme at the Cockatoo Island Dockyard, Sydney, and the Naval Dockyard, Melbourne. The Government intended to establish a naval base at Manus Island, in the Admiralty Group, to take the place of the present New Guinea base at Dredger Harbour, and would welcome arrangements with the United States Government for its joint use on the principle of reciprocity.

NEW ZEALAND

BIRTHDAY HONOUR.—The C.B. (Military Division) has been awarded to Commodore G. H. Faulkner, Chief of Naval Staff, R.N.Z.N., and First Naval Member, New Zealand Naval Board.

UNION OF SOUTH AFRICA

END OF THE "GENERAL BOTHA".—On 13th May, the South African training ship "General Botha" was towed out into False Bay, and sunk by gunfire from a battery at Simonstown. The "General Botha" was originally a cruiser, H.M.S. "Thames," launched in 1885, and later a submarine depot-ship. She was presented to the people of South Africa in 1921 by the late Mr. T. B. Davis as a training ship for the Merchant Marine, and served as such until the outbreak of the late war, when she was requisitioned for the Royal Navy as an accommodation ship at Simonstown. As she would have required refitting before further use as a training ship, and as the Government has undertaken the training of both mercantile and naval officers at the new establishment at Saldanha Bay, it was decided to sink her.

INDIA

NAVAL COMMANDER-IN-CHIEF.—From 1st March, 1947, the title of Flag Officer Commanding, Royal Indian Navy (short title, F.O.C., R.I.N.) lapsed, and the title of Commander-in-Chief, Royal Indian Navy (C. in C., R.I.N.) was adopted. Vice-Admiral Sir Geoffrey Miles, K.C.B., who was appointed Flag Officer Commanding in March, 1946, assumed the title of Commander-in-Chief on 1st March, 1947.

FORCE COMMANDERS.—The names of the Commanders of the Naval Forces appointed by the Governments of India and Pakistan were announced on 30th July. Captain J. T. S. Hall, R.I.N., will command the Naval Forces of India; and Commodore J. W. Jefford, R.I.N., those of Pakistan, both with the rank of Rear-Admiral. Both these officers have served for 25 years in the Royal Indian Navy.

INDIA AND PAKISTAN FORCES.—Decisions reached by the Partition Council regarding the allotment of units of the Royal Indian Navy between the new States of India and Pakistan were announced in Delhi on 11th July. India has been allotted four sloops, two frigates, 12 minesweepers, one corvette, one surveying vessel, various trawlers and harbour defence craft, and all existing landing craft. Pakistan has been allotted two sloops, two frigates, four minesweepers, and eight trawlers and harbour defence craft.

FOREIGN NAVIES

FRANCE

OFFICERS' LOWER DECK TRAINING.—Newly joined officers, as part of their training, serve a cruise on the lower deck of small ships such as light cruisers, destroyers, submarine chasers and escort vessels as Quartermasters' Mates, or in the case of engineer officers, as Mechanists' Mates. They are quartered with the crew in the proportion of two or three in each vessel.

TRIALS OF THE EX-GERMAN U-BOAT 2326.—Trials which were carried out with the surrendered U-boat 2326 at the end of last year included 35 hours underwater tests using the *schnorkel*. A French Press report says that no discomfort was experienced by the crew despite variations in pressure when the air shaft of the *schnorkel* closed due to waves or variations in immersion. The engines worked admirably. In a heavy sea the submarine took in about half a ton of water every ten minutes despite the automatic closing of the shaft but this was easily ejected from the bilges.

As reported in the February JOURNAL, this U-boat was subsequently lost off Toulon when engaged in deep diving tests.

ITALY

SUMMER CRUISE.—Ships of the fleet which Italy has been allowed to retain assembled for the traditional summer cruise in the latter part of July. They included the battleship

" Duilio," the cruisers " Garibaldi " and " Montecuccoli," and a number of destroyers, torpedo-boats, and corvettes.

After leaving Taranto, the fleet was to visit Palermo, Cagliari, Spezia, Genoa, and Naples. It was also to meet an American squadron, consisting of a cruiser and four destroyers, at La Maddalena (Sardinia), before returning to its bases on 15th August.

NORWAY

TRANSFER OF A BRITISH CRUISER.—It is understood that H.M.S. " Arethusa " is being transferred on loan for four years to the Royal Norwegian Navy. The intention is that she shall be used as a sea-going training ship for young officers and new ratings for which a larger ship is required than the destroyers remaining to the Norwegian Fleet after the War.

TRANSFER OF A FLOTILLA LEADER.—It is officially announced that the flotilla leader laid down as H.M.S. " Crown " at Scotts yard, Greenock, has been sold to the Norwegian Government. She was commissioned on 17th April as H.N.M.S. " Oslo." Her Commanding Officer is Commodore J. A. Jacobsen, O.B.E., Royal Norwegian Navy. The " Oslo " is one of the " C " class destroyers of 1,710 tons, mounting four 4.5 in. dual-purpose guns and six smaller A.A. guns, also eight 21 in. torpedo tubes. With a horse-power of 40,000, her designed maximum speed is 34 knots, this has been exceeded on trials.

UNITED STATES

CONTAMINATION OF THE BIKINI TARGET SHIPS.—The Naval Director of Atomic Defence—Rear-Admiral William S. Parsons, in a statement to the Press in April of this year, said that so far the naval scientists had been unable to find a sufficiently powerful decontaminating agent to make the vessels used in the atom bomb tests carried out at the beginning of July, 1946, safe from radio activity. Some twenty ships, it is understood, are still so radioactive that they cannot be manned, nor could they be broken up for scrap for fear that dangerous radioactivity may still be latent in the metal.

These " hot " ships, as they are called, will be the objects of research for some time to come. Among them are the battleships " New York " and " Nevada," which are being kept at Pearl Harbour, the carrier " Independence " at San Francisco and the cruiser " Pensacola " and destroyer " Hughes " at Bremerton, Washington.

Admiral Parsons referred to the difference between the contamination resulting from the air burst of the first test and the water burst of the second. He said that after the air burst it was safe to swim in the lagoon but not after the water burst. Most of the contamination, however, appeared to come from a film of radioactive oil. There was no sizeable amount of contamination on the beaches as the main cloud from the water burst did not spread over the island. So far they had no accurate knowledge of what would happen if such a bomb were exploded in the ground but it was conceivable that radioactive dust and fragments might be carried hundreds of miles down-wind.

RADIO-CONTROLLED AIRCRAFT EXPERIMENTS.—Experiments with radio-controlled missiles are being carried out at Point Mugu, California. According to a Press report really long distance control is still in its infancy and it has been semi-officially stated that progress is little further advanced in the field of guided missiles than that which the Germans attained at the end of the War.

In one experiment referred to, an 8,000 lb. miniature V-1 type " buzz-bomb " crashed on account of a technical mishap. These missiles are launched with the jet engine in low gear. The radio signal that changes it into high gear after the requisite height has been attained is similar to the " nose down " signal. In this instance the bomb faltered from insufficient power on its take-off but the Operator could not change gears lest he should nose it into the ground, so he had to let it crash land. It is anticipated that continued experiments will be very costly, but they are considered vital to American defence.

JET FIGHTER DEVELOPMENT.—The Navy Department is developing a jet fighter for use in carriers. Owing to the limited length of runway for launching (less than 1,000

feet, and frequently less than 400 feet due to the necessity for parking aircraft on the flight deck) a propeller-jet power plant has been tried out. In certain designs of these composite power plant aircraft, only the propeller engine is used for take-off, climb, cruising and landing. The only operating conditions in which both plants are used are for accelerated take-off, take-off with overload, accelerated rate of climb and maximum high speed conditions.

HELICOPTERS FOR CARRIER RESCUE WORK.—Very successful results are reported to have been achieved by a helicopter employed for air-sea rescue work when operating with the carrier " Franklin D. Roosevelt " in mid-ocean, and it is reported that the intention is to equip every carrier with a rescue helicopter. This, it is said, may even take the place of the attending destroyer.

In one instance a helicopter picked up the pilot of an aircraft which had crashed, who had sunk twice in a heavy sea and was going down for the third time when he grasped the steel cable and rescue belt lowered from the helicopter, hovering very low over the surface. With great difficulty, owing to his dazed condition, he was drawn into the cabin. The helicopter reached the pilot before the escorting destroyer had even changed course to the scene of the accident, and it returned the injured passenger to the carrier less than five minutes after the crash.

VISIT OF TRAINING SQUADRON TO UNITED KINGDOM.—A Naval Training Squadron, including the 45,000 ton battleships " New Jersey " and " Wisconsin " and the 27,100 ton aircraft carrier " Randolph," visited Rosyth, Portsmouth and Weymouth from 23rd June to 17th July. Tours of educational and recreational value and sporting and social entertainments on an extensive scale were arranged for approximately 2,200 Midshipmen under training and 8,000 officers and men of the ships' companies.

During the stay of the Squadron at Portsmouth, Admiral Richard L. Connolly, Commander U.S. Naval Forces, Eastern Atlantic and Mediterranean, hoisted his flag in the " New Jersey," Rear-Admiral H. H. McLean, Commander of the First Battleship Division, flew his flag in the " Wisconsin," and Rear-Admiral J. Perry, Commander of the Sixth Carrier Division and of the Task Force taking part in the cruise, flew his in the " Randolph."

ARMY NOTES

H.M. The King

It was announced on 13th May that the King had been pleased to assume the appointment of Colonel-in-Chief, The Royal Berkshire Regiment.

The King has given orders for the following appointments :—

The Queen as Colonel-in-Chief, The Manchester Regiment.

The Duchess of Kent as Colonel-in-Chief, The Queen's Own Royal West Kent Regiment.

On 12th June His Majesty was present at The King's Birthday Parade on the Horse Guards Parade. The King was accompanied by The Princess Elizabeth (Colonel, Grenadier Guards) and the Duke of Gloucester (Colonel, Scots Guards).

The King who was accompanied by The Queen, The Princess Elizabeth and The Princess Margaret, presented Colours to the Royal Military Academy, Sandhurst on 14th June (see also page 487).

On 16th June, The King, who was accompanied by The Queen and The Princess Margaret, received the Colours of the 2nd Battalion Welsh Guards for safe custody while the Battalion is in suspended animation.

The King and Queen, accompanied by The Princess Elizabeth and The Princess Margaret, were present at a Service in Sandringham Church on 29th June on the occasion of the laying up of the Colours of the 1st Battalion The Royal Norfolk Regiment.

On 19th July, The Queen accepted the Freedom of Perth conferred upon The Black Watch, of which regiment she is Colonel-in-Chief.

The Princess Elizabeth visited the Royal Hospital, Chelsea on 29th May on the occasion of Founder's Day and inspected the in-pensioners.

The Princess Elizabeth (Colonel, Grenadier Guards) was present at a Service of the Grenadier Guards Comrades Association outside the Royal Military Chapel, Wellington Barracks, on 1st June and subsequently took the Salute at a March Past.

The Princess Elizabeth (Colonel, Grenadier Guards) inspected the 1st Battalion Grenadier Guards at Chelsea Barracks on 8th July.

Between the 15th and 19th May the Duke of Gloucester paid a round of visits to regiments in the British Army of the Rhine of which he is Colonel-in-Chief.

The Duke of Gloucester, as Colonel of the Regiment, inspected the 2nd Battalion Scots Guards at Windsor on 21st May. On 26th June, as Colonel-in-Chief, he inspected the 2nd Battalion The Gordon Highlanders, at Edinburgh.

The King has approved the following appointments :—

To be Aide-de-Camp General to the King.—General Sir Edwin L. Morris, K.C.B., O.B.E., M.C. (23rd April, 1947).

To be Aides-de-Camp to the King.—Colonel P. G. J. Gueterbock, C.B., D.S.O., M.C., T.D. (11th April, 1945) ; Colonel (acting Major-General) E. B. de Fonblanque, C.B.E., D.S.O. (6th March, 1947) ; Lieut.-Colonel J. Turnbull, M.C., E.D., Indian Auxiliary Force (21st February, 1945) ; Lieut.-Colonel H. N. Brock, E.D., Indian Auxiliary Force (7th July, 1946) ; Colonel (temporary Brigadier) R. H. R. Steward, C.B., C.B.E., D.S.O. (11th March, 1947) ; Colonel (temporary Brigadier) B. T. Godfrey-Fausset, C.B., D.S.O., O.B.E., M.C. (15th December, 1946).

To be Hon. Physician to the King.—Lieut.-Colonel (local Brigadier) J. Bennet, M.D., M.R.C.P., R.A.M.C. (31st March, 1947).

To be Hon. Surgeon to the King.—Colonel N. Briggs, C.I.E., V.H.S., I.M.S. (12th November, 1946).

To be Colonels Commandant.—Of the Royal Artillery, General Sir William Morgan, K.C.B., D.S.O., M.C., and Lieut.-General Sir Charles Allfrey, K.B.E., C.B., D.S.O., M.C. (both dated 1st January, 1947) and Lieut.-General Sir Wyndham Green, K.B.E., C.B., D.S.O., M.C. (16th January, 1947); of the Royal Horse Artillery, Major-General (Hon. Lieut.-General) E. F. Norton, C.B., D.S.O., M.C. (1st January, 1947); of the Royal Tank Regiment, Major-General Sir Percy Hobart, K.B.E., C.B., D.S.O. (1st May, 1947); of the Corps of Royal Military Police, General Sir Miles C. Dempsey, K.C.B., K.B.E., D.S.O., M.C., A.D.C.

To be Colonels of Regiments.—Of the 14th/20th Hussars, Lieut.-General Sir Richard McCreery, K.C.B., K.B.E., D.S.O., M.C. (21st May, 1947); of the 17th/21st Lancers, Colonel (temporary Major-General) R. A. Hull, C.B., D.S.O. (1st July, 1947); of The Manchester Regiment, Colonel (Hon. Major-General) C. D. Moorhead, C.B., D.S.O. M.C. (11th April, 1947); of the 15th/19th Hussars, Captain (Hon. Brigadier) Sir Henry Floyd, Bt., C.B., C.B.E. (1st January, 1947); of The Duke of Cornwall's Light Infantry, General Sir Daril Watson, K.C.B., C.B.E., M.C., A.D.C. (17th January, 1947); of The Seaforth Highlanders, Colonel (Hon. Major-General) Sir John Laurie, Bt., C.B.E., D.S.O. (1st July, 1947); of The Gloucestershire Regiment, Lieut.-General Sir Edward Wetherall, K.B.E., C.B., D.S.O. (1st June, 1947); of The Jat Regiment, Indian Army, Lieut.-General Sir Frank Messervy, K.B.E., C.B., D.S.O., I.A. (13th June, 1947); of the Royal Scots Greys, R.A.C., Colonel (acting Brigadier) G. H. N. Todd, M.C. (1st January, 1947); of The King's Own Yorkshire Light Infantry, Colonel (Hon. Major-General) W. Robb, C.B.E., D.S.O., M.C. (9th August, 1947)

To be Hon. Colonel.—Of The Shropshire Yeomanry, R.A.C., Territorial Army, Lieut.-General Sir Oliver W. H. Leese, Bt., K.C.B., C.B.E., D.S.O. (2nd May, 1947).

Army Council

The King was pleased by Letters Patent under the Great Seal bearing date 28th May 1947 to appoint the following to be His Majesty's Army Council :—

Captain the Right Hon. F. J. Bellenger—*President.*
Major J. Freeman, M.B.E.—*Vice-President.*
Field-Marshal Viscount Montgomery of Alamein, K.G., G.C.B., D.S.O.
General Sir Richard N. O'Connor, K.C.B., D.S.O., M.C., A.D.C.
General Sir Daril G. Watson, K.C.B., C.B.E., M.C., A.D.C.
Lieut.-General Sir Frank E. W. Simpson, K.B.E., C.B., D.S.O.
Lieut.-General Sir Sidney C. Kirkman, K.B.E., C.B., M.C.
Sir Eric B. B. Speed, K.C.B., K.B.E., M.C.

Honours and Awards

The following award was announced on 6th May :—

K.C.V.O.—Major-General Sir John N. Kennedy, K.B.E., C.B., M.C.

The following awards were included in the King's Birthday Honours List published on 12th June :—

G.C.B.—General Sir Richard N. O'Connor, K.C.B., D.S.O., M.C., A.D.C.; General Sir Daril G. Watson, K.C.B., C.B.E., M.C., A.D.C.

K.C.B.—General Sir John T. Crocker, K.B.E., C.B., D.S.O., M.C.; Lieut.-General Sir Neil M. Ritchie, K.B.E., C.B., D.S.O., M.C.

K.C.S.I.—Lieut.-General Sir Frank W. Messervy, K.B.E., C.B., D.S.O., Indian Army.

K.C.M.G.—Lieut.-General Sir Brian H. Robertson, Bt., K.C.V.O., C.B., C.B.E.) D.S.O., M.C.

K.B.E.—Lieut.-General G. I. Thomas, C.B., D.S.O., M.C.; Lieut.-General (acting. E. Wood, C.B., C.I.E., M.C., Indian Army.

Knight Bachelor.—Brigadier H. L. Scott, C.B., D.S.O., M.C., Indian Army.

C.B.—Major-General F. S. Clover, C.B.E., A.M.I.Mech.E.; Major-General J. F. B. Combe, D.S.O.; Major-General W. A. Dimoline, C.B.E., D.S.O., M.C.; Major-General (temporary) B. E. C. Dixon, C.B.E., M.C.; Major-General W. Foot, M.C., M.B., K.H.P.; Major-General H. L. Longden, C.B.E.; Major-General N. McMicking, C.B.E., D.S.O., M.C.; Major-General H. Redman, C.B.E.; Brigadier (temporary) H. Shapcott, C.B.E., M.C.; Major-General (temporary) A. W. Sproull, C.B.E.; Major-General (acting) B. Temple, O.B.E., M.C.; Major-General (acting) J. D. Woodall, O.B.E., M.C.; Major-General (temporary) R. E. Le Fleming, O.B.E., M.C., I.A.; Major-General (acting) H. R. Swinburn, M.C., I.A.; Major-General (temporary) R. B. Dalison, O.B.E., I.A.; Major-General (temporary) M. Glover, O.B.E., I.A.

The following awards were included in those announced on 26th June in recognition of gallant and distinguished services in the Netherlands East Indies prior to 30th November, 1946:—

K.B.E.—Lieut.-General (acting) E. C. Mansergh, C.B., C.B.E., M.C.

C.B.—Major-General (local) J. F. R. Forman, C.B.E., D.S.O., Indian Army.

George Cross.—It was announced on 26th June that the King has approved the award (posthumous) of the George Cross to Driver J. Hughes, Royal Army Service Corps, for outstanding self-sacrifice and devotion to duty at Hong Kong on 21st March, 1946.

Appointments

United Kingdom.—Major-General R. F. S. Denning, K.B.E., C.B., has been appointed Chief of Staff, Eastern Command (1st May, 1947).

Major-General C. M. Smith, C.B., C.B.E., M.C., has been appointed Chief of Staff, Northern Command (1st May, 1947).

Major-General N. McMicking, C.B.E., D.S.O., M.C., has been appointed Chief of Staff, Scottish Command (1st May, 1947).

Major-General J. F. C. Holland, C.B., D.F.C., has been appointed Chief of Staff, Western Command (1st May, 1947).

T/Brigadier C. B. Robertson, C.B., C.B.E., M.C., has been appointed Chief of Staff, Southern Command, with acting rank of Major-General (1st May, 1947).

T/Brigadier B. C. H. Kimmins, C.B., C.B.E., has been appointed Director of Quartering, War Office (regranted temporary rank of Major-General, 11th June, 1947).

Local Major-General V. Blomfield, C.B., D.S.O., is to be Director of Personal Services, War Office, with acting rank of Major-General (September, 1947).

T/Major-General H. Murray, C.B., D.S.O., is to be Commander, 1st Division (December, 1947).

Major-General P. N. Balfour, C.B., C.B.E., M.C., is to be Commander, 7th Armoured Division (November, 1947).

Major-General G. P. B. Roberts, C.B., D.S.O., M.C., is to be Commander, 2nd Division (November, 1947).

Germany.—T/Brigadier E. C. Herbert, C.B., C.B.E, D.S.O., has been appointed Commander, British troops, Berlin, with acting rank of Major-General (27th May, 1947).

Egypt.—Major-General R. N. Gale, C.B., D.S.O., O.B.E., M.C., is to be G.O.C., British Troops, Egypt (January, 1948) with acting rank of Lieut-General.

Promotions

The following promotions have been announced:—

Generals.—The following Lieut.-General to be General:—Sir Neil Ritchie, K.B.E., C.B., D.S.O., M.C. (23rd April, 1947, with seniority 5th October, 1946).

Lieut.-Generals.—The following Major-Generals (sometimes temporary or acting Lieut.-Generals) to be Lieut.-Generals:—O. M. Lund, C.B., D.S.O. (23rd April, 1947, with seniority 31st May, 1944); C. H. Gairdner, C.B., C.B.E. (31st May, 1947, with seniority 30th December, 1944); N. M. S. Irwin, C.B., D.S.O., M.C. (13th June, 1947, with seniority 30th June, 1944).

Major-Generals.—The following Colonels (temporary or acting Major-Generals) to be Major-Generals :—H. C. Stockwell, C.B., C.B.E., D.S.O. (23rd April, 1947, with seniority 4th December, 1946) ; R. H. B. Arkwright, C.B., D.S.O. (2nd May, 1947, with seniority 21st December, 1946) ; W. E. Tyndall, C.B., C.B.E., M.C., M.B. (1st June, 1947) ; A. D. Ward, C.B., C.B.E., D.S.O. (31st May, 1947, with seniority 7th March, 1946) ; R. C. McCay, C.B., C.B.E., D.S.O., Indian Army (25th February, 1947) ; R. A. Hull, C.B., D.S.O. (13th June, 1947, with seniority 21st October, 1946) ; G. P. B. Roberts, C.B., D.S.O., M.C. (18th June, 1947, with seniority 24th March, 1945) ; E. B. de Fonblanque, C.B.E., D.S.O., A.D.C. (19th June, 1947, with seniority 30th January, 1944).

The following Colonels (acting Major-Generals) to be temporary Major-Generals :—A. T. F. Smith, C.B.E., M.C., I.A. (1st March, 1947) ; E. B. Marsh, M.C., M.B., M.R.C.P. (1st May, 1947) ; J. B. Macdonald, O.B.E., I.A. (12th September, 1946).

The following Lieut.-Colonel (acting Major-General) to be temporary Major-General:—J. B. Churcher, D.S.O. (10th March, 1947).

The following Colonels to be acting Major-Generals :—F. Harris, C.B.E., M.C., M.B. (12th April, 1947) ; J. J. Magner, M.C., M.B. (1st May, 1947).

To be local Major-General :—Lieut.-Colonel (temporary Brigadier) F. H. R. Maclean, C.B.E., M.P. (16th June, 1947).

Retirements

The following General Officers have retired :—Major-General R. H. Laurie, C.B., C.B.E. (6th April, 1947) ; General Sir H. Charles Loyd K.C.B., K.C.V.O., D.S.O., M.C. (23rd April, 1947) ; Major-General I. S. O. Playfair, C.B., D.S.O., M.C. (2nd May, 1947) ; Lieut.-General Sir T. Ralph Eastwood, K.C.B., D.S.O., M.C. (31st May, 1947) ; Major-General C. M. P. Durnford, C.B., C.I.E., I.A. (3rd June, 1947) ; Lieut.-General Sir N. M. de la P. Beresford-Peirse, K.B.E., C.B., D.S.O. (13th June, 1947) ; Major-General Sir Robert M. Scobie, K.B.E., C.B., M.C., with hon. rank of Lieut.-General (18th June, 1947) ; Major-General R. G. W. H. Stone, C.B., D.S.O., M.C., with hon. rank of Lieut.-General (28th June, 1947) ; Major-General Sir A. Edward Grasset, K.B.E., C.B., D.S.O., M.C., with hon. rank of Lieut.-General (2nd July, 1947) ; Major-General Sir Philip Neame, V.C., K.B.E., C.B., D.S.O., with hon. rank of Lieut.-General (17th July, 1947).

Territorial Army

Territorial Staffs.—The War Office announced on 22nd May that there were no more vacancies for non-Regular officers as adjutants or quartermasters in the Territorial Army. No waiting lists were being compiled.

The Royal Military Academy, Sandhurst

The following is quoted from *The Times* of 16th June :—

" New Colours were presented by the King on 14th June to the Royal Military Academy, Sandhurst. The King was accompanied by the Queen and the two Princesses.

Rain fell heavily during the ceremony, and the battledress of the cadets, formed up before the quiet, dignified façade of the Old Building, was already wet when the Royal Family arrived. The King, therefore, ignored the shelter of the covered saluting base erected at the head of King's Walk and stood in the downpour to take the salute.

The new Colours, uncased and placed on piled drums in the centre of the square, were consecrated by the Chaplain-General, Canon F. Llewellyn-Hughes. With slow solemnity the King presented the Colours to the two kneeling Colour-bearers, saluted, and then, in an address, said :—' When you salute your Colours, remember the generations who have studied and served here before you, and do nothing to tarnish their honour. For you and for all of us the future is more important still. I ask you to think of this while you are here and to do everything that you can, both by your

conduct and your work, to fit yourself for the exacting day ahead. Try to do better even than those who have gone before you. Above all, remember that the career which you have undertaken is one of great unselfishness.'

The Colours were then marched past in slow and quick time. About half of the 700 cadets on parade have been at the Academy for only six weeks, but they marched with precision which did credit to Regimental Sergeant-Major A. J. Brand, who is soon to take up a permanent appointment with the South African Army.

About 4,000 spectators braved the rain to watch the parade."

Miscellaneous

Army Supplementary Reserve.—The War Office announced on 28th April that the Supplementary Reserve was to be reconstituted. The detailed organization and revised terms of service would be announced later.

A.T.S.—Since 31st May last, volunteers for the A.T.S. are required to serve for a fixed period of two years. There is a liability to serve at home or overseas, though as far as possible only volunteers will be posted abroad.

Auxiliaries will not be entitled to a bounty or gratuity on discharge, but they will be allowed to retain their Service clothing. They will also receive 24 days' release leave. Those serving on a two years' engagement will be eligible to join the Regular Women's Service when it is formed.

C.M.F.—General Headquarters, Central Mediterranean Forces, moved from Padua to Venice at the end of June.

Army Education Advisory Board.—It was announced on 11th June that, following the departure of Lord Pakenham from the office of Parliamentary Under-Secretary of State for War, Sir Philip R. Morris, C.B.E., M.A., Vice-Chancellor of Bristol University, has accepted the invitation of the Secretary of State for War to resume the Chairmanship of the Army Education Advisory Board for the next twelve months.

Rifle Shooting.—In the schools' competition for the Ashburton Shield at Bisley on 3rd July, Eton College won the trophy, with Glenalmond (Trinity College) second and George Watson's College third.

Cadre Strength.—Up to 6th August, the infantry battalions of the Regular Army which have been placed in " suspended animation " or are at token cadre strength in the United Kingdom are :—

In Suspended Animation
- 2nd Bn. Irish Guards
- 2nd Bn. Welsh Guards

At Token Strength
- 1st Bn. The Buffs
- 1st Bn. The Royal Northumberland Fusiliers
- 1st Bn. The Royal Warwickshire Regiment
- 1st Bn. The King's Regiment.
- 1st Bn. The Royal Lincolnshire Regiment.
- 2nd Bn. The Devonshire Regiment.
- 2nd Bn. The Suffolk Regiment.
- 2nd Bn. The Bedfordshire and Hertfordshire Regiment.
- 2nd Bn. The Lancashire Fusiliers.
- 1st Bn. The Cheshire Regiment.
- 2nd Bn. The South Wales Borderers.
- 2nd Bn. The King's Own Scottish Borderers.
- 1st Bn. The Cameronians.
- 2nd Bn. The Royal Inniskilling Fusiliers.
- 1st Bn. The Gloucester Regiment
- 2nd Bn. The Worcestershire Regiment.

2nd Bn. The Border Regiment.
1st Bn. The South Lancashire Regiment.
2nd Bn. The Loyal Regiment.
1st Bn. The Northamptonshire Regiment.
1st Bn. The Royal Berkshire Regiment.
1st Bn. The North Staffordshire Regiment.
2nd Bn. The York and Lancaster Regiment.
1st Bn. The Royal Irish Fusiliers.
2nd Bn. The Argyll and Sutherland Highlanders.

B.C.O.F.—Between July and September there will be a gradual reduction in the strength of the British Commonwealth Occupation Force in Japan. The Indian contingent will be withdrawn and the strength of the New Zealand Army component reduced. There will be no alteration in the areas occupied by or the responsibilities allotted to the B.C.O.F.

INDIA

PARTITION OF INDIAN ARMY

Reference to developments in India is made in General Service Notes (see page 470.) On 14th and 15th July it was announced from Delhi that the allocation of units of the Indian Army between the Union of India and Pakistan would be as follows :—

Infantry

To India.—2nd Punjab Regiment, Madras Regiment, Indian Grenadiers, Mahratta Light Infantry, Rajputana Rifles, Rajput Regiment, Jat Regiment, Sikh Regiment, Dogra Regiment, Royal Garhwal Rifles, Kumaon Regiment, Assam Regiment, Sikh Light Infantry, Bihar Regiment, Mahar Regiment.

To Pakistan.—1st, 8th, 14th, 15th and 16th Punjab Regiments, Baluch Regiment, Frontier Force Regiment, Frontier Force Rifles.

Armoured Corps

To India.—Twelve Armoured Corps units including Skinner's Horse, Gardner's Horse, Hodson's Horse, King George V's Own Light Cavalry, King Edward VII's Own Light Cavalry.

To Pakistan.—Probyn's Horse, the Duke of Connaught's Own Lancers, King George V's Own Lancers, Prince Albert Victor's Own Cavalry.

Artillery

Eighteen and a half artillery regiments have been allotted to India and eight and a half to Pakistan.

Engineers

Sixty-one Engineer units go to India and thirty-four to Pakistan.

CORRIGENDA

In Army Notes in the May issue of the Journal, page 301, from the list of battalions placed in " suspended animation " delete the

1st Bn. The Royal Welch Fusiliers
2nd Bn. The Essex Regiment

which, it is regretted, were inserted in error.

AIR NOTES

GREAT BRITAIN

H.M. The King

The King unveiled the Battle of Britain Memorial in Westminster Abbey at a Service of Dedication on 10th July, in the presence of The Queen, Queen Mary, The Princesses Elizabeth and Margaret, and a large representative assembly. The Chaplain-in-Chief of the R.A.F.—the Rev. J. A. Jagoe, read the Lesson, and the Archbishop of Canterbury—Dr. Geoffrey Fisher, gave an address.

The four Vickers Viking aircraft of the King's Flight returned to Abingdon from their South African and Rhodesian tour on 9th May, three days before the landing of their Majesties from the "Vanguard." Air Commodore E. H. Fielden, Captain of the King's Flight, said that during the tour the aircraft flew 200,000 miles, each being in the air for about 250 hours.

Air Commodore T. McClurkin has been appointed Honorary Physician to the King, vice Air Marshal K. Biggs, C.B.E., M.C., who relinquished his appointment on retirement (1st June, 1947).

Air Vice-Marshal D. McLaren, C.B.E., and Air Commodore F. J. Murphy, C.B.E., have been appointed Honorary Surgeons to the King, vice Air Vice-Marshal A. E. Panter, C.B., and Air Vice-Marshal T. J. Kelly, C.B.E., M.C., who relinquished their appointments on retirement (1st June, 1947).

Appointments

Air Vice-Marshal S. E. Toomer has been appointed Air Officer in Charge of Administration, Technical Training Command.

Air Commodore A. Gray has been appointed Air Officer Commanding, Air Headquarters, Iraq, with the acting rank of Air Vice-Marshal.

Air Vice-Marshal T. M. Williams has been appointed Commandant of the R.A.F. Staff College, Bracknell.

Air Vice-Marshal J. D. I. Hardman has been appointed Assistant Chief of the Air Staff (Operations), Air Ministry.

Air Vice-Marshal S. C. Strafford has been appointed Senior Air Staff Officer, Bomber Command.

Air Commodore T. G. Dowler has been appointed Air Officer Commanding No. 40 Group, Maintenance Command, with the acting rank of Air Vice-Marshal.

Air Vice-Marshal C. R. Steele has been appointed Air Officer Commanding, Air Headquarters, Malta.

Air Vice-Marshal A. P. Davidson has been appointed Director-General of Organization, Air Ministry.

The Ministry of Civil Aviation announces the appointment of Air Marshal Douglas Colyer as the first Civil Air Attaché to the British Embassy in Paris.

On 23rd July, the Air Ministry announced the following further appointments :—

Air Vice-Marshal Sir Arthur Penrose Martyn Sanders, K.B.E., C.B., to the Air Ministry, for duty with the Committee for Revision of R.A.F. Manuals.

Air Vice-Marshal Kenneth Buchanan Lloyd, C.B.E., A.F.C., to be Senior Air Staff Officer, Headquarters, Coastal Command.

Air Vice-Marshal Philip Herbert Mackworth, C.B.E., D.F.C., to be Air Officer in Charge of Administration, Headquarters, Transport Command.

Promotions

Air Marshal Sir Roderic M. Hill, K.C.B., M.C., A.F.C., A.D.C., is promoted to the rank of Air Chief Marshal (16th January, 1947).

Air Marshal Sir Norman H. Bottomley, K.C.B., C.I.E., D.S.O., A.F.C., is promoted to the rank of Air Chief Marshal (23rd March, 1947).

Air Vice-Marshal Sir Thomas W. Elmhirst, K.B.E., C.B., A.F.C., is granted the acting rank of Air Marshal (13th February, 1947).

Air Vice-Marshal C. B. Cooke, C.B., C.B.E., is granted the acting rank of Air Marshal (9th April, 1947).

Air Commodore A. L. A. Perry-Keene, O.B.E., is granted the acting rank of Air Vice-Marshal (29th November, 1946).

Air Commodore A. Gray, C.B., M.C., is granted the acting rank of Air Vice-Marshal (26th March, 1947).

Retirements

Air Chief Marshal Sir Arthur S. Barratt, K.C.B., C.M.G., M.C. (27th March, 1947).

Air Marshal Sir Grahame Donald, K.C.B., D.F.C., A.F.C., on account of medical unfitness for Air Force service (24th May, 1947).

Air Vice-Marshal Sir John H. D'Albiac, K.B.E., C.B., D.S.O., retaining the rank of Air Marshal (14th April, 1947).

Air Commodore (temporary Air Vice-Marshal) S. P. Simpson, C.B., C.B.E., M.C., is granted the substantive rank of Air Vice-Marshal (26th March, 1947) and placed on the Retired List (27th March, 1947).

Air Commodore (Medical Branch) Kenneth Biggs, C.B.E., M.C. (and re-employed), (4th March, 1947).

Group Captain (temporary Air Commodore) Richard Kellett, C.B.E., D.F.C., A.F.C., on account of medical unfitness for Air Force service, retaining the rank of Air Commodore (10th April, 1947).

Group Captain (temporary Air Commodore) C. S. Cadell, C.B.E. (at own request), retaining the rank of Air Commodore (10th May, 1947).

Equipment Branch.—Group Captain (temporary Air Commodore) Arthur Garrity, C.B.E., retaining the rank of Air Commodore (14th April, 1947).

Group Captain (temporary Air Commodore) H. L. Crichton, C.B., M.B.E., retaining the rank of Air Commodore (1st April, 1947).

Group Captain (temporary Air Commodore) Walter Thorne, C.B., C.B.E., is granted the substantive rank of Air Commodore (13th May, 1947), and placed on the Retired List, retaining the rank of Air Vice-Marshal (14th May, 1947).

Honours and Awards

Birthday Honours

The following were among the honours conferred on the official celebration of the King's Birthday on 12th June :—

K.C.B. (Military).—Air Marshal Cyril B. Cooke.
Air Marshal Robert V. Goddard.

C.B. (Military).—Air Vice-Marshal A. L. Paxton, Air Vice-Marshal T. A. Warne-Browne, Air Vice-Marshal A. L. A. Perry-Keene, Air Commodore F. Beaumont, Air Commodore R. B. Jordan, Air Commodore J. G. W. Weston, Group Captain E. N. Lowe.

C.V.O.—Wing Commander P. W. Townsend.

K.B.E. (Military).—Air Vice-Marshal William B. Cushion (Retired).

C.B.E. (Military).—Air Commodore A. D. Davies, Group Captain J. M. Cohu, Group Captain F. A. Norton, Group Captain G. C. Stemp, Group Captain H. E. Cardwell, Group Captain T. G. G. Hutchinson.

Bar to A.F.C.—Group Captain E. M. Donaldson,
Squadron Leader W. A. Waterton, R.A.F.O.

Personnel

New Battle Dress.—War Service dress (battle dress), as supplied to all R.A.F. personnel in the future, will have tailored revers ; the fastening at the neck is to disappear.

Other changes are : top pocket buttons and shoulder strap buttons of black plastic embossed with an eagle and crown, and two back pockets for the trousers instead of one. The side pockets of the trousers are cut on the slant.

LONG SERVICE MEDAL FOR OFFICERS.—R.A.F. officers may now qualify for the Long Service and Good Conduct Medal. Hitherto this award has been confined to other ranks. It is awarded after 18 years service, including not less than 12 years in the ranks of the regular forces. A clasp is awarded for a further 18 years service including not less than nine in the ranks.

The ribbon has two central strips of red and blue with edgings of white. Applications should be addressed to Air Ministry (S.7 (d)), Adastral House, W.C.2.

PROMOTION FROM THE RANKS.—The policy of the R.A.F. is to offer more Commissions to non-commissioned officers and airmen, and over 6,000, or one-third of the total number of permanent and extended service Commissions authorized, have been granted to ex-regular airmen. Ninety per cent. of the extended service Commissions and 89 per cent. of the permanent Commissions given to technical engineers have been offered to ex-regular airmen.

AUXILIARY AIR FORCE REGIMENT SQUADRONS.—Four Light A.A. Squadrons of the Auxiliary Air Force Regiment began recruiting on 1st June in the Middlesex, Edinburgh, Gloucester and West Riding areas. The chief need, it was stated, was for ex-R.A.F. Regiment members, but other men, particularly those with gunnery experience, could also apply.

Each squadron will be fully mobile and equipped, in the same manner as a regular Regiment Squadron, as a first line defence unit for local A.A. and ground defence. The Regiment Squadrons will combine for some exercises with the local A.A.F. flying squadron. Training will take place at weekends, evenings, and an annual fifteen days camp.

Headquarters will be at Stanmore for No. 2604 (Middlesex) Squadron ; at Turnhouse for No. 2603 (Edinburgh) Squadron ; at Filton for No. 2501 (Gloucester) Squadron ; and at Yeadon for No. 2609 (West Riding) Squadron.

Applicants should write to the Adjutant of the Squadron.

WOMEN'S AUXILIARY AIR FORCE

The Duchess of Gloucester, Air Chief Commandant of the W.A.A.F., was present on 28th June at the eighth birthday celebrations of the Force held at the Headquarters of Fighter Command, Bentley Priory, Stanmore, Middlesex. Over 300 W.A.A.F. officers and airwomen took part in the celebrations. The Director of the W.A.A.F.—Air Commandant F. H. Hanbury, invited the Duchess to cut the birthday cake.

NEW FORM OF ENGAGEMENT.—It is announced by the Air Ministry that as from 1st June, 1947 airwomen will be enrolled in the W.A.A.F. on a two years engagement instead of the present enrolment for " Duration of present emergency." It is hoped that the nucleus of the post-war women's side of the Royal Air Force will be formed from among those enrolled under the new system and from those who extend their Service or return to the W.A.A.F. under the extended service scheme, last November.

TRAINING CENTRE.—R.A.F. Hawkinge, in Kent, is to be the training centre for the W.A.A.F. Beginning in October, a three-weeks' course will be started for officers appointed to extended service Commissions for a period of three, four or five years. Separate courses have been planned for N.C.O's., potential instructors who will hold the rank of corporal or above, and serving and ex-serving W.A.A.F. who have signed on for a further period of service under the extended service scheme.

Courses are planned to prepare all ranks to undertake their full responsibilities in administration and general service matters and to develop powers of leadership and initiative.

Air Training Corps

New Royal Warrant.—The King has approved a new Royal Warrant for the Air Training Corps, incorporating a definition of the objects of the Corps in times of peace.

These are to promote and encourage among young men a practical interest in aviation and to fit them to serve their country; to provide training which will be useful both in the air Services and civil life; to foster the spirit of adventure and develop the qualities of mind and body which go to the making of a leader and a good citizen. The training syllabus of the Corps is being revised to bring it into line with these new objects.

Organization

No. 24 Squadron.—No. 24 Squadron, Transport Command, is being reorganized to include representation from the Royal Australian Air Force, Royal New Zealand Air Force, and South African Air Force, and will be renamed No. 24 (Commonwealth) Squadron.

Malta Command.—From 1st July, the Malta Command has assumed the administration of Tripolitania and Cyrenaica, including the R.A.F. stations at Benina and El Adem. These areas are now under the Middle East Command.

Exercises

Strategical Exercise.—A conference was announced to be held at Old Sarum airfield, Salisbury, on 11th and 12th August between Marshal of the R.A.F. Lord Tedder, Chief of the Air Staff, and R.A.F. Commanders-in-Chief, to be followed by an exercise ("Thunderbolt"), with the object of applying to future strategy the lessons learned from the combined Anglo-American bomber offensive in Europe in 1943-45. Senior officers of the R.A.F., the Dominion Air Forces, and of other Services, and officials of the Ministry of Defence, were invited to attend this exercise, the first of its kind to be held by the R.A.F. since the War.

Parachute Exercise.—A demonstration of air transport support for ground forces was given to the 42 senior officers of all three Services in Great Britain, the Dominions and the United States attending the special course at the School of Air Support. The exercise took place at Netheravon on 14th May, following a demonstration of new developments in tactical air support for the Army at West Lavington on the previous day.

Bombing Exercise on Heligoland.—Carrying out the same technique and tactics as they used in the air war against German targets, forty Lincoln and Lancaster aircraft bombed the island of Heligoland on the night of June 30th–July 1st. Each of the bombers discharged a "token" load of one 500-lb. bomb.

Pathfinder Mosquitos preceded the bombers and marked the target with coloured target indicators. The raid was controlled by a master bomber. H-Hour over the target was 1.59 a.m. (D.B.S.T.) and the main striking force attacked in two waves from 18,000 feet.

The bombers then flew over Hanover and Dortmund, and on their return simulated a raid on this country to exercise the defences. Night fighters of R.A.F. Fighter Command intercepted the force over the North Sea and as it crossed the East Anglian Coast and dispersed to its various bases.

Record Flight to the Cape

A R.A.F. Mosquito, piloted by Squadron Leader H. B. Martin, with Squadron Leader E. B. Sismore as navigator, made a record flight from London to the Cape on 30th April and 1st May. It reached Brooklyn airfield, Capetown, at 5.35 p.m., on 1st May, 21 hours and 29 minutes after leaving London Airport. This beat the previous official solo record from London of Mr. Alex Henshaw in 1939 by 17 hours, 56 minutes; and the dual record of Flying Officer Clouston and Mrs. Kirby Green in 1937 by 23 hours, 36 minutes. The two officers were greeted by Air Commodore W. E. Staton, Commanding No. 45 Group, R.A.F., who said that this record would probably stand until jet aircraft

were sufficiently developed to attempt long-range flights. Two brief stops, one hour in all, were made during the flight, at El Adem and Kisumu.

Squadron Leader Martin, an Australian, took part in the bombing of the Möhne dam in Germany, and Squadron Leader Sismore took part in the daylight attack on Berlin in 1943 which stopped Göring's speech.

DOMINIONS AND COLONIES

SOUTH AFRICA

A total of 136 Supermarine Spitfire IX fighters is being transferred from the Royal Air Force to the South African Air Force at the rate of between 10 and 16 a month from April to November. Pilots of No. 46 Group, R.A.F. Transport Command, ferry the aircraft from Pershore, Worcestershire, to Fayid, Egypt, with intermediate stops at Bordeaux Istres, Elmas (Sardinia), Malta, Benina (Libya) and El Adem (Egypt). South African pilots take over at Fayid. The fighters are flown in convoy, with a Mosquito aircraft to navigate them.

INDIA

CHIEF OF INTER-SERVICE ADMINISTRATION.—The India Office announced on 9th May that the King has been pleased to approve the appointment of Air Vice-Marshal (acting Air Marshal) Sir Thomas W. Elmhirst, K.B.E., C.B., A.F.C., as Chief of Inter-Service Administration, India, to date 15th February, 1947. (See also General Service Notes.)

FIRST INDIAN AIR COMMODORE.—An Indian officer of the Royal Indian Air Force has been promoted to air rank. He is Air Commodore Subrota Mukerjee, O.B.E., who has been appointed Deputy Assistant to the Air Officer in charge of Administration at Air Headquarters, India. He is the most senior officer of the R.I.A.F. and was the first Indian officer to be commissioned in it on its formation as the Indian Air Force in August, 1932.

He was trained at the R.A.F. College, Cranwell and afterwards served for nine months in the United Kingdom with No. 16 Squadron of the R.A.F.

FOREIGN

DENMARK

By an Agreement, made at Copenhagen in August, 1946, and recently published by H.M.S.O. as Cmd. 7141, British aircraft and equipment to the value of £450,000 have been sold to the Royal Danish Government.

The aircraft included 26 Spitfires H.F.IX, 5 Sea Otters and 44 Oxfords I. The equipment included spare engines, maintenance spares, signals equipment and synthetic trainers.

EGYPT

Recently there has been a considerable change in the equipment of several squadrons. This is now as follows :—

No. 1 Fighter Reconnaissance Squadron	Spitfires.
No. 2 Fighter Squadron	Spitfires.
No. 3 Communications Squadron	Dakotas.
No. 4 General Reconnaissance Squadron	Ansons.
No. 5 Fighter Squadron	(?)
No. 6 Fighter Squadron	Spitfires.

The withdrawal of British forces from the Delta has made the Egyptians realize that their own military forces are far from adequate for purposes of national defence. Plans for expansion are therefore being considered. The Minister of Defence has stated that an outlay of between £E.70,000,000–80,000,000 will be called for plus an annual expenditure of £E.22,000,000. It is extremely doubtful whether Egypt will be able to afford this great expense.

PERSIA

The formation of a Grand Council of Aviation to co-ordinate all military and civil aviation matters is reported. The Inspector General of the Persian Air Force is the President of the Council, and members include the Director of the Department of Civil Aviation, the Head of the Persian Air Force, one technical officer and a legal adviser. The exact functions of the Council are not known.

The Persian Air Force is organized into two Regiments—one Bomber and one Reconnaissance. Both regiments are stationed at Doshan Teppah airfield, Teheran, with small detachments disposed from time to time in different parts of the country.

Flying training is carried out at Doshan Teppah. The school consists of three groups, Elementary, Service and Advanced. There is also one ground training group. The majority of the trainees are officers, but N.C.Os. are also trained.

There is a Maintenance and Repair Unit located at Teheran where major repairs and overhauls are undertaken.

The aircraft include Anson, Tiger Moth, Hawker Hind, Audax and Fury types. Hurricane aircraft have been reconditioned and erected in Persia by Persian engineers aided by a small team of Hawker and Rolls Royce personnel.

POLAND

According to Warsaw radio, about 140 two-seater training aircraft have been ordered from U.S.A. war surplus stores, and of these about 64 are to be turned over to the Polish Aero Club. Delivery was expected to be completed in February, 1947.

From a study of newspaper reports, the Polish aircraft industry for some time to come will be capable only of repairs and overhauls of aircraft manufactured in foreign countries.

SWEDEN

Preliminary orders have been placed for seventy " Scandia " aircraft. The first of these should be leaving the factory next Spring, and the rate of production will then be six to ten aircraft per month.

A Press report indicates that the struggle between the government and private enterprise over the proposal to make Swedish Civil Aviation a Government monopoly continues.

TURKEY

The new uniforms of the Air Force are to be seen at special functions. The uniform represents a close copy of that of the Royal Air Force, although slightly more ornate It is believed that this new uniform will be standard throughout the whole service within a year.

UNITED STATES

GOODWILL AND TRAINING VISIT.—Nine B.29 Super-Fortresses of No. 340 Squadron, United States Army Air Force, landed at the R.A.F. Station, Marham, Norfolk, on 9th June, on a week's goodwill and training visit to the R.A.F. They were led by Colonel Charles L. Sommers, Chief of Staff, 15th Air Force, and were received by Air Marshal Sir Hugh Saunders, Air Officer Commanding-in-Chief, Bomber Command, and Air Commodore G. R. C. Spencer, Commandant at Marham. Marshal of the R.A.F. Lord Tedder, Chief of the Air Staff, was present to welcome the visitors, with Mr. Geoffrey de Freitas, M.P., Under-Secretary of State for Air.

The King invited 150 officers and enlisted men of the U.S. Army Air Forces to be present in the forecourt of Buckingham Place on 12th June, when he and Princess Elizabeth rode out to attend the ceremony of Trooping the Colour on the Horse Guards Parade.

AIRCRAFT ORDERS.—The Army Air Forces have placed an order with the North American Aviation Corporation for 250 P-82's (Twin-Mustang). They have also ordered a further 134 P-80's (Shooting Star) jet aircraft. This latest order, according to reports, means that the Lockheed Aircraft Corporation has either delivered or has on order 1,066 of these aircraft for the A.A.F.

SUCCESSFUL TEST FLIGHTS.—During the recent months, the following three new types of aircraft have been successfully test-flown :—

Hughes XF-11.—This is a twin-engine long range photo-reconnaissance aircraft designed by Howard Hughes. It may be remembered that it was in the first aircraft of this type that Hughes nearly lost his life while carrying out the original test flight.

Boeing B-50.—A long range heavy bomber, adapted from the basic design of the B-29 (Superfortress) and now in production for the Army Air Forces, who have placed an order for 133 of these new bombers.

Kellett XR-10.—A twin-engined transport type helicopter designed to carry ten passengers in addition to the pilot and co-pilot at a top speed well in excess of 100 miles per hour. It is not only the largest helicopter designed for the Army Air Forces but also the first to be fitted with twin engines.

REVIEWS OF BOOKS

GENERAL

Lord Cochrane. By Christopher Lloyd. (Longmans, Green & Co.) 15s.

A life of Cochrane does not break new ground, for he was such a colourful character that he was bound to attract other biographers, notably Fortescue with his *Dundonald*, which Mr. Lloyd duly mentions in a fairly comprehensive bibliography.

The author of this new work dedicates it 'To the Cadets who were in my Tutor set at Dartmouth.' It may well be, therefore, that when he wrote it he had in mind that to their successors, as to all young officers, a life of Cochrane would provide at once an inspiration and an admonition—as indeed it does. The accounts of his brilliant exploits afloat, especially when in command of H.M.S. " Imperieuse " ; at the battle in the Aix Roads ; when he captured the Spanish flagship " Esmeralda " from under the guns of Callao ; and when he destroyed a Portuguese convoy of nearly fifty ships after their flight from Rio, are full of inspiration and examples of what brilliant leadership, following on meticulous forethought and planning, can achieve.

On the other hand we have the ' horrible warning ' of an able but impetuous officer who would not suffer fools or knaves gladly, and of what befell him when they were Admirals or politicians, or—as was usually the case in his days—both ! It was a tragedy that, at an early stage in his naval career, Cochrane should have fallen foul of St. Vincent for, if they could have known and understood each other, the " testy old man " and the ardent young reformer might have discovered that the heart of each was in the right place.

That such a fine commander, gallant officer, and successful leader should have been driven, not only out of the Navy, but even out of the country to find an outlet for his abilities and energies among sinister adventurers in Chile, Peru and Brazil, was a lasting reproach against the partisanship and political intrigues of those times. Yet, when all is said, he had mainly himself to blame. Although, at the end of a long life, he fought his way back into favour and secured a great measure of restitution, he might have done so much more for the Service he loved if he had been more tolerant, more subtle, and more disciplined. But those qualities were not in his nature.

Mr. Lloyd has written a most readable life of this vivid personality and it can be warmly recommended, not only because it is a true picture of bad old days, but because it conveys the lesson for all time that officers in H.M. Services should keep aloof from party politics.

We Live by Exports. (H.M. Stationery Office.) 4d.

This is a " child's guide " to the economics of imports and exports, but in view of the monumental ignorance of the elements of the subject among a very large proportion of the nation, it is a timely publication. The diagrams are so simple and graphic that they do not require any high degree of intellect to understand them and the lessons they teach.

No doubt the object of this pamphlet is to further the " Work or Want " propaganda, as well as to show why we cannot keep what we make. As such it merits the widest publicity. But it entirely fails to bring out the fundamental fact that, for this country, the whole system of imports and exports by which we live depends on ships—rapid building, full manning, speedy loading and unloading, and safe voyaging ; in short, on sea communications and sea power. It is a pity that these things are not included as being inseparable from this vital part of national education.

ARMY

Playing With Strife. By Lieut.-General Sir Philip Neame, V.C., K.B.E., C.B., D.S.O. (George G. Harrap and Co., Ltd.). 15s.

The author of this autobiography has had an adventurous life, and this straightforward account of his experiences will interest many of our readers.

General Neame served in France throughout almost the whole of the 1914-18 War. He gives a full description of the action which won him the V.C. at the end of 1914. In the recent war he spent the first few months in France, and thereafter had military commands in the Middle East until captured in Libya in 1941. The account of his time as a prisoner of war in Italy is full of interest and often thrilling.

During the years of peace the writer certainly lived a full life. This period included twelve years of nearly continuous service in India. There are chapters on big game shooting both in Europe and in India, where he had the misfortune to be mauled by a tiger. There is also an interesting description of his visit to Tibet with the British politico-military mission which went to that country in 1936.

Adult Education: The Record of the British Army. By Major T. H. Hawkins and L. J. F. Brimble. (Macmillan and Co. Ltd.) 15s.

Here is a comprehensive study of education in the British Army. The book is well written and full of interest throughout. It should be read by every member of the Royal Army Educational Corps. Further, it should appeal to everyone interested in adult education in general.

The book is divided into four parts. Starting with its early origins, Part I traces the history of Army education through the 1914-18 War and up to 1939. Part II—much the longest portion—deals with developments during the 1939-45 War. Part III describes the Army education scheme in the release period; and Part IV discusses Army education and the national system.

ADDITIONS TO THE LIBRARY

GENERAL

DETOUR: THE STORY OF OFLAG IV C. Edited by Lieutenant J. E. R. Wood. Cr. 4to. 183 pages. (Falcon Press, 1946.) 12s. 6d.

Oflag IV C was a special camp for prisoners of war who had already attempted escape, or had proved troublesome to the German authorities in other ways. This memorial volume is compiled from original narratives—all true—written by the officers for the camp scrap-book, and it is illustrated with pastel portraits of the men, also done in the camp, by Lieutenant J .F. Watton. All proceeds from the sale of the book will be given to the Red Cross.

DEFEAT IN THE WEST. By Milton Shulman. Demy 8vo. 336 pages. (Secker and Warburg, 1947). 15s.

The author served as an Intelligence Officer in the Canadian Army and specialized in the German Order of Battle during the campaign in North-West Europe. After the surrender, he interviewed most of the senior German commanders and studied thousands of captured security documents. His book is the story of the collapse of the German armies in the West and a study of the reasons therefor. Major-General Sir Ian Jacob, who was Assistant Military Secretary to the War Cabinet, says in the Introduction he has written, " There is no doubt about the essential accuracy of the picture that emerges."

PSYCHOLOGY FOR THE ARMED FORCES. Edited by Edwin G. Boring. Demy 8vo. 533 pages. (U.S.A. Infantry Journal, 1945.) Not priced. Presented by H. B. Cleghorn, Esq.

Experts in the different psychological fields discuss the uses of psychology in the armed forces of sea, land and air.

ATOMIC ENERGY IN HUMAN AND COSMIC LIFE. By George Gamow. Crown 8vo. 161 pages. (Cambridge University Press, 1947.) 7s. 6d. Presented by the Publishers.

The author traces the path of discovery which led to the atomic age, and gives an account of the accomplished facts and immeasurable possibilities of released atomic energy.

THE SOVIET IMPACT ON THE WESTERN WORLD. By E. H. Carr. Crown 8vo. 116 pages. (Macmillan, 1947). 5s.

This book consists of six lectures on the principal effects of Soviet politics, economy, propaganda and ideology on Europe and on Great Britain in particular. The author is Professor of International Politics at the University College of Wales.

THEY CAME TO SPY: AN ACCOUNT OF NAZI ESPIONAGE IN GREAT BRITAIN. By Stanley Firmin. Demy 8vo. 156 pages. (Hutchinson, 1947.) 16s.

The correspondent of *The Daily Telegraph* accredited to Scotland Yard gives what he describes as the first full, authentic account of British counter-espionage in this country during the late war.

THE BETWEEN-WAR WORLD: A SHORT POLITICAL HISTORY, 1918-1939. By J. H. Jackson. Crown 8vo. 472 pages. (Gollancz, 1947.) 10s. 6d.

A revised and enlarged edition of a work first published in 1935 under the title *The Post-War World*.

BRITAIN AND RUSSIA. By K. W. B. Middleton. Medium 8vo. 226 pages. (Hutchinson, 1947.) 21s.

A history of the relations between this country and Russia from Tudor times to the present day, (United Nations Literary Competition Selection.)

WHERE ARE WE HEADING? By Sumner Welles. Demy 8vo. 328 pages. (Hamish Hamilton, 1947.) 15s.

This is Mr. Welles's second book on American policy towards the outside world. Beginning with the Atlantic Charter, he traces the course of progress towards world order, commenting on the errors, obstacles, difficulties of personality, failures or achievements of each international conference up to the present time, including the sessions of the United Nations Security Council.

THE GREAT CHALLENGE. By Louis Fischer. Demy 8vo. 350 pages. (Jonathan Cape, 1947.) 18s.

The great challenge is the challenge of peace, of one world or two. Accepting that Russia is the central problem, analysis and discussion of Russia's role in the world form the core of this book. Three chapters are concerned with affairs in India.

ON GOVERNING COLONIES. By W. R. Crocker. Demy 8vo. 152 pages. (Allen & Unwin, 1947.) 10s. 6d.

The author, who has had experience of West Africa as an administrator and soldier, analyses the current problems which face the Colonial authorities in Africa, and shows how they are dealt with by the British, French and Belgian governments.

RUSSIA FROM A TO Z. By H. A. Freund. Crown 8vo. 692 pages. (Angus & Robertson, 1945.) 15s.

Dr. Freund has compiled and presented in clear, concise language a "dictionary" of the Soviet Union, covering subjects under the following broad headings: Revolution; State and Party; Foreign Relations; Economic System; Social Principles; General Knowledge.

TRANSPORT: ITS HISTORY AND ECONOMICS. By Dudley Evans. Demy 8vo. 122 pages. (Pitman, 1946). 10s. 6d.

This book was originally published as "The History and Economics of Transport" in which the present author collaborated. The statistical material has been brought up to date, and there are chapters on Railways, Canals, Shipping and Civil Aviation.

ONE WORLD OR NONE: A REPORT TO THE PUBLIC ON THE FULL MEANING OF THE ATOMIC BOMB. Edited by Dexter Masters and Katharine Way. Crown 8vo. 159 pages. (Latimer House, 1947), (U.S.A., 1946). 7s. 6d.

The facts in this book give a step-by-step analysis of the basic problems involved in the use of atomic energy and are presented in simple non-technical words. Among the contributors are Einstein and General Arnold, Chief of the U.S. Air Staff from March 1943 to February 1946, who discusses air power in the atomic age.

EUROPEAN TRANSPORT: THE WAY TO UNITY. By M. Zwalf. Demy 8vo. (Paper covers). 39 pages. (Gollancz, 1946.) 2s.

This small book, one of the Fabian Research Series, is full of clearly expressed information on the present international situation of transport in Europe. The author explains the lack of progress in the idea of a co-ordinated European system of transport and the lukewarm support by the member Governments of the European Central Inland Transport Organization (E.C.I.T.O.) with its modest powers.

NEWFOUNDLAND: ECONOMIC, DIPLOMATIC AND STRATEGIC STUDIES. Edited by R. A. MacKay. Medium 8vo. 554 pages. (Oxford University Press, 1946.) 30s.

The contributors examine in detail the economy of the island, and trace its transition from a lonely fishing station to one of the bastions of Atlantic defence. They define Newfoundland's strategic and diplomatic importance in the Western hemisphere, and throw new light on the constitutional issues that have faced the island.

CHINA'S DESTINY. By Chiang Kai-Shek. With Notes and Commentary by Philip Jaffe. Demy 8vo. 347 pages. (Dennis Dobson, 1947.) 15s.

This book has been called the *Mein Kampf* of China, and after a wide circulation in China it is now presented for the first time in English. In giving his version of the " leader " principle and the theory of " racial " supremacy, Generalissimo Chiang Kai-Shek displays his deep conviction of the superiority of all things Chinese; his scorn of Western political concepts ; his plan for maintaining the Kuomintang dictatorship even at the cost of civil war ; and his views concerning China's future foreign relations. The book is compulsory reading in Chinese schools ; for army officers, civil servants and members of the Kuomintang Youth Corps ; and for all students at the Kuomintang Central Political Training Institute.

WESTMINSTER IN WAR. By William Sansom. Demy 8vo. 202 pages. (Faber & Faber, 1947.) 12s. 6d.

This is a detailed narrative, supported by official records, of events in the City of Westminster during the blitz and flying-bomb raids of the early and later periods of the war. It is a record of the life of Londoners and the organization of the Civil Defence services ; one part deals with the evolution of these services during the intervening lull.

WAR, SADISM AND PACIFISM. By Edward Glover. Crown 8vo. 276 pages. (Allen & Unwin, 1947.) 9s. 6d.

Essays on group psychology and war comprise the first part of this book, and the remainder deals with sociological causes of war and methods of war prevention.

THE VICTORY CAMPAIGN. By Strategicus. Large crown 8vo. 261 pages. (Faber & Faber, 1947.) 12s. 6d. Presented.

This, the final volume of Strategicus' story of the War, opens on 11th May 1944, with the Allied campaign in Italy, and ends with the Japanese surrender. The value of the book perhaps lies in the accounts of the great Russian offensives in Central Europe, the Fourteenth Army's actions in the East and the American approach to Japan by way of the Marianas, the Philippines, Iwojima and Okinawa. In a chapter on the *Führer Prinzip* an attempt is made to discover some of the main lessons of the War.

THE SECOND GREAT WAR. A Standard History in 7 Vols. Edited by Sir John Hammerton and Major-General Sir Charles Gwynn. (Waverley Book Coy., 1947.) £8 11s. 0d.

IN SEARCH OF TWO CHARACTERS : SOME INTIMATE ASPECTS OF NAPOLEON AND HIS SON. By Dormer Creston. Demy 8vo. 402 pages. (Macmillan, 1945.) Published price 18s. Second-hand copy.

The title of this book indicates its scope. As regards Napoleon, it is not a life of him but an exploration into his character, and an attempt is made to trace his reactions to various emotional pressures.

BUCKINGHAM, 1592-1628. By M. A. Gibb. Demy 8vo. 334 pages. (Cape, 1935.) Second-hand copy.

This is a sympathetic study of George Villiers, Duke of Buckingham, the great favourite of both James I and Charles I, and an attempt is made to show that he was not the vicious and irresponsible being as presented by some historians.

GUERNSEY UNDER GERMAN RULE. By Ralph Durand. Large crown 8vo. 183 pages. (Guernsey Society, 1946.) 6s.

NAVAL

LORD COCHRANE. By Christopher Lloyd. Medium 8vo. 217 pages. (Longmans Green, 1947.)

See review in this JOURNAL. Presented.

NAVAL BIOGRAPHY OF GREAT BRITAIN. By J. Ralfe. Medium 8vo. 4 vols. (Whitmore & Fenn, 1828.) Extra set presented by J. F. Tregoning, Esq.

FUEHRER CONFERENCES ON NAVAL AFFAIRS, 1942. Foolscap. 82 pages. (Admiralty, 1947.)

FUEHRER CONFERENCES ON NAVAL AFFAIRS, 1943. Foolscap. 114 pages. (Admiralty, 1947.) See article on "The German Navy in Defeat" in this Journal.

HISTORY OF THE MODERN AMERICAN NAVY: FROM 1883 THROUGH PEARL HARBOUR. By Donald W. Mitchell. Demy 8vo. 477 pages. (Murray, 1947.) 21s. Presented.

THE STONE FRIGATE. By Lieutenant John Davies, R.N.V.R. Crown 8vo. 179 pages. Macmillan, 1947). 7s. 6d.

The writer recounts his experiences during his period of training from civilian to seaman.

MILITARY

THE ATTACK. By Stephen Bagnall. Crown 8vo. 220 pages. (Hamish Hamilton, 1947.) 8s. 6d.

From his experiences and emotions in the Normandy fighting, the writer records the ordinary infantryman's reactions to his part in a plan too big for him to comprehend as a whole.

THIS BAND OF BROTHERS. By Jeremy Taylor. Crown 8vo. 271 pages. (White Swan Press, 1947.) 10s. 6d.

A history of the Reconnaissance Corps from its formation at the beginning of 1941 until it was disbanded in August, 1946.

S-2 IN ACTION. By Shipley Thomas. Large crown 8vo. 128 pages. (U.S.A., 1940.) Not priced. Presented by H. B. Cleghorn, Esq.

This United States publication deals with the training of the Regimental Intelligence Officer.

FRONT-LINE INTELLIGENCE. By Lieut.-Colonel Stedman Chandler and Colonel Robert W. Robb. Demy 8vo. 183 pages. (U.S.A. Infantry Journal, 1946.) Not priced. Presented by H. B. Cleghorn, Esq.

This book explains the problems that confront the Regimental Intelligence Officer, and tells how to solve them.

BURMA SURGEON RETURNS. By Gordon S. Seagrave. Large crown 8vo. 205 pages. (Gollancz, 1946.) 10s. 6d.

This book covers the period from March, 1943, to October, 1944, during which time the authors' surgical unit with its Burmese nurses accompanied General Stilwell's advance to Myitkyina and beyond, in the re-conquest of Burma.

ADULT EDUCATION: THE RECORD OF THE BRITISH ARMY. By T. H. Hawkins and L. J. F. Brimble. Large crown 8vo. 420 pages. (Macmillan, 1947.) 15s.
See review in this JOURNAL. Presented.

WINGATE'S PHANTOM ARMY. By W. D. Burchett. Demy 8vo. 195 pages. (Muller, 1947.) 12s. 6d.

The author, who was a war correspondent attached to General Wingate's expedition into Burma, tells of the passage through the Japanese lines. The phases are covered well in so small a book, and the chapter on training for guerrilla tactics is valuable, especially if read in conjunction with Brigadier Fergusson's book, *The Wild Green Earth*.

THE FILIBUSTERS. By John Lodwick. Demy 8vo. 189 pages. (Methuen, 1947.) 12s. 6d.

This story of the Special Boat Service records the operations of an amphibious commando force during the War.

THE DORSETSHIRE REGIMENT, Vols. I and II. By C. T. Atkinson. Medium 8vo. 825 pages. (Privately printed, 1947.) Presented by the Author.

BRITAIN AT WAR, Vol. V: THE ARMY—BRITISH AND ALLIED, OCTOBER, 1944—SEPTEMBER, 1945. By Major E. W. Sheppard. Crown 4to. 312 pages. (Hutchinson, 1947.) 21s. Presented by the Author.

COSTUMES OF THE MADRAS ARMY. Original sketches by Captain T. J. Ryves. Presented by Robert J. Jones, Esq.

The following collection was presented by R. D. Trotter, Esq. :—

SKETCHES AND INCIDENTS OF THE SIEGE OF LUCKNOW. By C. H. Mecham. (Day, 1858.)

ORIGINAL SKETCHES IN THE PUNJAUB. By "A Lady." (Dickinson, 1854.)

WATERLOO ATLAS. By Captain W. Siborne.

ILLUSTRATIONS OF THE SIEGE AND CAPTURE OF BHURTPORE (No. 1). (Asiatic Lithographic Press, 1826.)

THE CAMPAIGN OF WATERLOO. Engravings, plan and view, with history. By R. Bowyer. (Bensley, 1816).

CHARACTER AND COSTUMES OF AFGHANISTAUN. Sketches. By Captain L. W. Hart. (Graves, 1843.)

SKETCHES IN AFGHANISTAUN. By J. Atkinson. (Graves, 1842.) Lithographed by Haghe.

VIEWS IN INDIA FROM DRAWINGS TAKEN DURING THE SEAPOY MUTINY. By D. S. Greene (McLean, 1859.)

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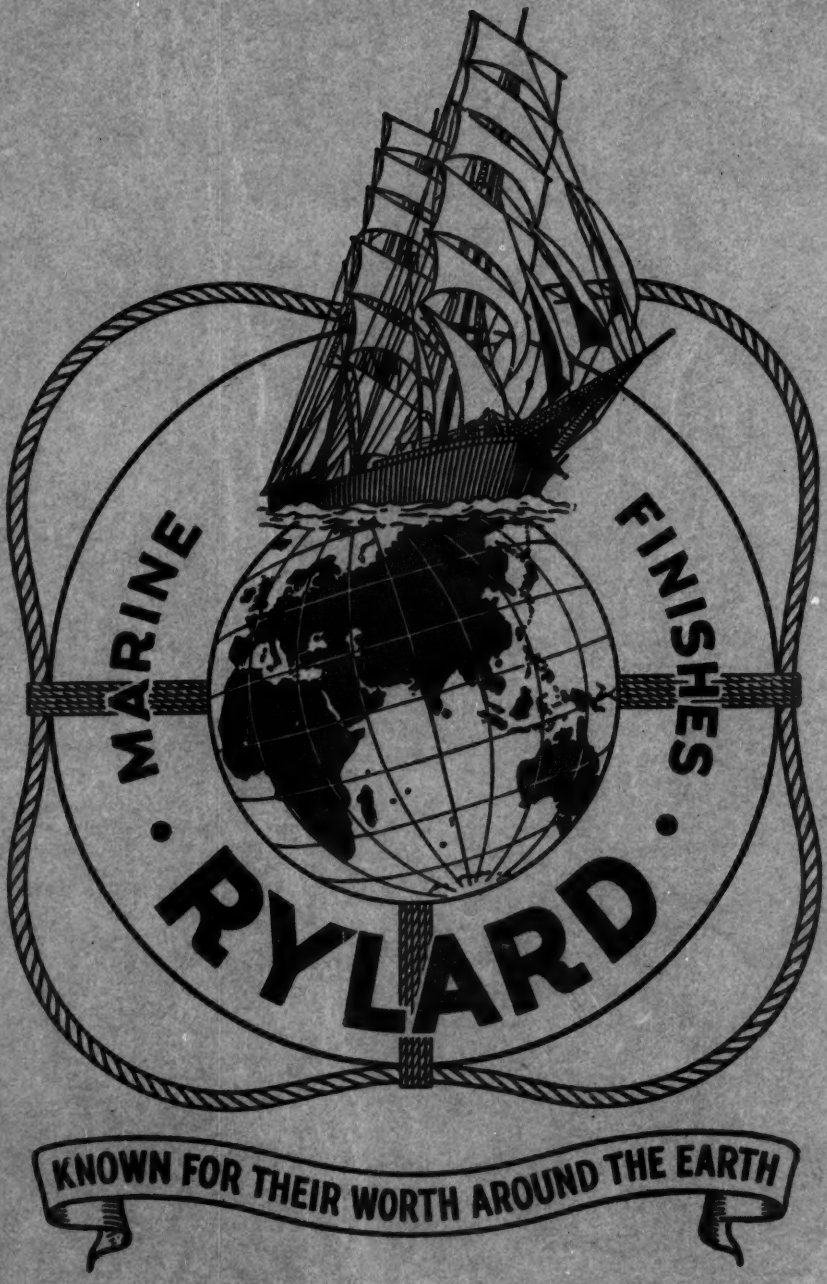
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